PRODUCTIVITY TRENDS IN THE INDIAN PUBLIC SECTOR: WITH SPECIAL REFERENCE TO IRON AND STEEL INDUSTRY

ABSTRACT

Thesis Submitted for the Degree of

Doctor of Philosophy

IN

COMMERCE

BY

Abdul Quayyum Khan

Under the Supervision of

Dr. Asif Ali Khan

DEPARTMENT OF COMMERCE
ALIGARH MUSLIM UNIVERSITY
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A B S T R A C T

Public Sector Undertakings (PSU) have geen assigned a significant role in Industrial growth and development of India. They incur responsibility to social, economic and financial objectives by providing substantial scope for increased production, return on investment, generation of employment opportunities, balanced economic growth and development of ancillary industries. Public Sector Enterprises assumes significant role in accelerating the process of industrialisation in the country.

Thoush India possessed skill in Iron-making even in Vedic days, the Industry vanished during British rule. In pre-independent days, there were barely two private steel plants ____ TISCO and IISCO. After Independence, it became crystal clear that accelerated transformation of Indian economy can be attained unless Steel Industry is vastly expanded in the Public Sector. As a result, over more than three decades, there are six integrated Public Steel Plants, producing 90% of the steel. Yet these plants are not able to attain the targetted output and economize their operation. Recently SAIL has formulated schemes for technological upgradation of the steel plants at Durgapur, Rourkela and Burnpur (IISCO)

at an estimated cost of Rs. 1,989 crores. However, perfermance of steel plants is not satisfactory due to infrastructural constraints including scarce supply of coal, power and bottlenecks in rail transport.

Productivity is a complex concept, full of problems of definitions and measurements. Even today, there are different opinions regarding a suitable concept of productivity. The conservative school favours internal rate of return as a measure of productivity, while the others challange it is a narrow concept and unsuitable to appraise the performance of Public Sector undertakings (PSUs). They support the view that the concept of value of output and services rendered by public investments are appropriate guide to the working of public sector enterprises. As a matter of fact, the concept of productivity denotes increase in output which are not accountable by increase in the quantity of inputs. It is, therefore, based on the assumption of relationship between inputs and outputs.

The phenomenal development of Public Enterprises is evident from the rising share in domestic product, net capital formation and the total employment in the organised sector. It, therefore, assumes paramount significance to undertake a meaningful analysis of the efficiency

and productivity of factors of production employed in the Public Sector Enterprises.

The broad frame work which the present study has adopted for analysing the productivity trends in Public Sector Enterprises has been expressed in the form of following equation :-

$$P = F\ (G_K,\ G_L,\ G_A)$$

where P, G_K, G_L and G_A denote that productivity is the function of capital input, labour input and overall efficiency of factor inputs respectively over a given period of time. The Research Scholar is of the opinion that the total factor productivity is appropriate for evaluating the overall performance of Public Sector Enterprises. Therefore, the index of total factor productivity has been prepared as a measure of output per-unit of total input. The index of total factor productivity is useful device to measure the extent of change (increase/decrease) in overall efficiency of factor input in any production process.

Steel Industry is taken up by the Research Scholar as a case study of productivity for a period spanning over 26 years, i.e. from 1960-61 to 1985-86. The analysis of productivity trend in the Steel Industry has been

divided into sections, the first section deals with the Public Sector steel plants and the second is concerned with the Steel Industry as a whole comprising both the Public and Private Sector steel mills. The later part of steel productivity analysis has been made more meaningful and objective for academic purposes by sub-classfying the productivity measures in terms of income, value-added and physical output ratios to capital and labour separately.

The Research Scholar has applied conventional accounting method to measure the operational efficiency, and sufficiency of Public Sector Undertakings is, therefore, examined in two broad parametres, viz; financial and physical. In financial analysis the Research Scholar has examined profitability, growth of sales, capital employed and investment in technology for replacement and modernisation, the physical performance includes appraisal of capacity utilisation and trends in utilisation of capacity in various significant public sector undertakings.

Poor financial performance is varified by the physical appraisal of public sector enterprises which is undertaken by Research Scholar because capacity utilisation and profitability are inter-connected. The analysis reveals that none of the Public Sector Enterprises was able to

attain normal capacity. Even after decades of their existence, a number of units have not been able to utilise as much of the capacity as 25%. The highest capacity utilisation is 75% attained by less than 70% of the enterprises. The Research Scholar is of the view that appropriate policies have to be formulated to deal with the problems of low capacity utilisation.

The Research Scholar is aware of his limitations to offer general treatment to the problems. There can not be one of reasons of low capacity utilisation in the whole Public Sector Undertakings. Therefore, a group-wise analysis is made of the important sector in a bid to diagnose the disease and suggest the treatment. The Research Scholar has made the following suggestions :-

1. An expert team consisting of academicians as well as technicians should be constituted for in-depth study of individual / enterprises to identify the causes of low capacity utilisation.

2. Infrastructural facilities should be adequately provided which frequently undermines the performance of Public Sector Enterprises.

3. Management of Public Enterprises should be so changed as to impart professionalism.

4. Dependence of Public Enterprises on spare parts from abroad should be reduced by establishing ancillary units.

5. The resources of Public Enterprises should be effectively deployed including reduction in inventories to normal trading cycle, toe mini mise the cost of production.

6. Financial sources o f public enterprises have to be delinked from national exchequer if they are to be financially disciplined.

7. Export activities of Public Enterprises should be promoted for more exchange earnings.

Under financial return, the Research Scholar found that, besides 1978-79 to 1982-83, SAIL has incurred losses due to idle capacity and low productivity, both of capital and labour. In this context, it is recommended to economise overload cost and take measures, including upgradation of technology.

Profitability ratios for the years i.e. 1982-83 and 1983-84 present a dismal picture of SAIL performance ratio of gross profit to net sales was negative. It is indicative of higher sale and manufacturing costs than the price

administered by the Government. Negative return on capital employed resulted in the loss net work of SAIL. It may be inferred that SAIL is unlikely to generate sufficient resources from its operation to maintain its net worth intact. Two options are available to the management of the steel plants either they can scrap the idle capacity of the plant or maximise productivity in a bid to reduce the cost to the level of the price administered by the Government. However, the first programme involving scoping of the idle capacity would be undesirable both from social and economic points of view. Therefore, every attempt should be made to reduce unit cost through higher productivity.

The Research Scholar has estimated the physical performance to examine as to whether the social capital is used by the industry efficiently. It is observed from the statistical analysis that the steel plants under SAIL have failed to reach optimum output level of 90% of the rated capacity. TISCO (in private) is the only steel plant which had utilised about 90% of the rated capacity during the period 1975-76 to 1984-85; while the SAIL had utilised only 76% of its rated capacity during the same period.

Productivity trend in public sector enterprises is examined to find out as to whether public sector has made optimum use of its resources. Public Sector registered

growth in its contribution to net domestic product at the rate of 8.53% during the period under study. The study reveals that commodity producing enterprises are major segments, of public sector, contributing 55% of the real net domestic product of the public sector as a whole. Substantial growth in public sector's share in net domestic product has followed rapid capital formation and more employment of labour force. But it is discernible from the study that there has been deceleration in capital formation when the same is analysed for sub-periods_____ 11% during 1975-76 to 1985-86. The commodity producing sector had 69% of the total capital stock in 1985-86. Of the two sectors, non-departmental enterprises employed more workers than the departmental _____ 57 lakhs in 1985-86 in non-departmental enterprises as against 35 lakhs in departmental enterprises.

It is also observed that the non-departmental enterprises are the leading Public Sector Enterprises, holding most of the capital and employing most of the workers. The share of labour and capital both in domestic product increased at current prices as well as in real terms.

Measured as a ratio of output to labour, the labour productivity revealed rising trend. However, the trend in labour productivity varied from tertiary sector to

commodity producing sector, andfrom departmental enterprises to non-departmental enterprises during the period of study. The capital productivity, as a ratio of output to capital, is marked by two dist ct trends____initially rising till 1975-76 and later on it declined. It shows inadequate regard to the creation of additional capacity which remained idle due to infrastructural bottlenecks,, labour trouble, etc.

The total factor productivity is affected because of divergent trends in capital and labour productivities. The total factor productivity, as a ratio of net product to total factor input, registered rising trend in the case of non-departmental enterprises and declining trend in the case of departmental. However, performance of commodity producing sector is better than that of the tertiary sector.

Comparing the trend in total factor inputs with that of the net product, it is found that the total factor input takes "U" shape and the total factor productivity takes on inverted "∩" form. Initial increase in the total factor productivity is the result of more than proportionate increase in net product than in factor input, and vice-versa, when the total factor productivity declined

It may be inferred that the Public Sector has not been efficiently utilising its resources.

Public Sector industry comprises the steel plants of SAIL, IISCO and Sponge Iron Steel. The productivity of iron and steel has been measured in terms of capital productivity labour productivity and the total factor productivity both. Value-added has been estimated for 26 years (i.e. from 1960-61 to 1985-86). In order to find out the trend, the entire period of study has been divided into five sub-periods (from 1960-61 to 1964-65, 1964-65 to 1969-70, 1969-70 to 1974-75, 1974-75 to 1979-80, 1979-80 to 1985-86 and 1960-61 to 1985-86). It is worth-citing that the value added showed increasing trend during the period under study yielding an annual growth of 33%.

The over all efficiency of steel group in public sector has been estimated. It is accepted that the over-all efficiency of inputs depends on technological improvements, and the capital intensity is a comprehensive indicator of the extend of technology used in production process of an enterprise. Analysis reveals steady increase in capital intensity from Rs, 1,17,778 in 1960-61 to Rs. 1,78,733, though it declined to Rs. 1,40,480 in 1985-86. The latter nine-year period (1978-86) is marked by decelerated capital formation. The trends in capital productivity have been lack-luster but steady in its upward movement. If capital

productivity is measured in terms of value-added, it increased from 0.8% in 1960-61 to 21% in 1985-86. It may be deduced that the value-added increased at a faster rate than the capital stock.

Total factor productivity has also been estimated with the help of indices for value-added, labour input and capital input. The total Factor productivity increased 28 times over the past (during 1960-61 and 1985-86). However, the Research Scholar discerns disparate trends in the growth rates of inputs, total factor productivity and value-added.

The steel industry, as a whole, has been examined for a further probe into productivity trend. It is observed by the Research Scholar that there has been a sharp increase in the growth of capital per worker employed in the industry. The capital productivity has declined in terms of income and value-added per-unit of capital. On the other hand, capital requirements per-tonne of ingot steel have shot up sharply due to high capital cost, and long-gestation period.

The labour productivity both in terms of income per-worker and value-added per-worker increased in public sector steel industry. However, TISCO registered a higher productivity due to judicious combination of factor inputs and

product, mix; a policy which cannot be practised in public steel plants if they are to fulfil social obligations, viz; creation of more jobs and to act as model employers.

In conclusion, public sector has failed to give an impressive account of itself both in financial and physical terms. The detailed analysis of productivity has brought to fore problemsarising from over-capatalisation, injudicious capital labour mix, high inventory level and low investment in upgradation of technology. Profitability and productivity are also partly accounted by top heavy management. Research Scholar has made suggestions to deal with the problems effectively.

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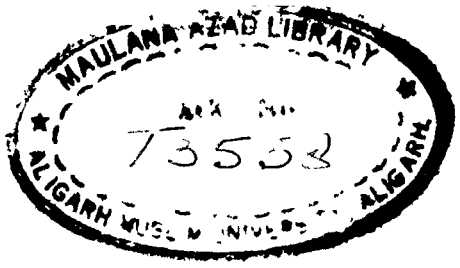

M. Asif Ali Khan
M.Com., Ph.D. (Alig.)
Department of Commerce
Aligarh Muslim University
ALIGARH

23-C, MEDICAL ENCLAVE
ALIGARH MUSLIM UNIVERSITY
ALIGARH

Dated November' 20,1987

I hereby certify that the present thesis entitled "Productivity Trends in the Indian Public Sector : With Special Reference to Iron and Steel Industry", is the original work of the Scholar, Mr.Abdul Quayyum Khan. It also fulfils the requirements for the submission of Ph.D. thesis at the Aligarh Muslim University, Aligarh

Mohd. Asif Ali Khan

(MOHD. ASIF ALI KHAN)
Supervisor
Department of Commerce,
Aligarh Muslim University,
Aligarh

C O N T E N T S

A C K N O W L E D G E M E N T

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Abdul Quayyum Khan

(ABDUL QUAYYUM KHAN)

P R E F A C E

The present thesis entitled "PDUCTIVITY TRENDS IN THE INDIAN PUBLIC SECTOR : WITH SPECIAL REFERENCE TO IRON AND STEEL INDUSTRY", is of topical interest. Modest endeavour had been made to critically appraise the Public Sector's overall performance. Enormity of the work can be guaged from the heterogeneous nature and size of Public Enterprises. Growing productivity is the result of interaction between a large number of technological, economic and political phenomenon. The augmenting productivity is rightly equated with economic progress compatible with social justice.

NATURE AND SCOPE OF THE ENQUIRY :

The Indian Public Sector Enterprises is confronted with host of contradictions. The massive thrust in plan outlays helped Public Sector reach the commending height of the economy. Its growth is accelerated. It is also diversified. But its performance belied the cherished expectations. The faith in Public Sector is now shackhed. The present study gives vent to a basis analysis of productivity changes in significant factor inputs of Public Enterprises. A case study of Iron & Steel Industry

has also been analytically presented. It covers a long span of 26 years (i.e. 1960-61 to 1985-86) approximately. Modest attempt has been made to pin point the areas where numerous pitfalls lie, followed by suggestions most suited to our public enterprises under existing Socio-economic condition.

RESEARCH METHODOLOGY

The Research Methodology is based on the principles of scientific procedure of thesis-writing to present the problems in its true perspective. The facts illustrated in the thesis are based on objective data and veriable evidence amply supported with theoritical justification and practical applicability. Analysis of Statistical evaluation has made the Research Scholar reach certain conclusions and recommend the suggestions based thereon.

The statistical analysis is based on secondary data collected from different sources. The Bureau of Public Enterprise's reports and public documents, R.B.I's Annual Reports and Annual Survey's of Individual Industries for various years, have been of great assistance in the course of study. Besides, Journals, Periodicals and Dailies for different years, have also been thoroughly consulted and made good use of.

LAY-OUT OF THE WORK :

The entire study has been divided into seven chapters : the first chapter "Growth of Public Sector Enterprises In India with Special Reference to Iron & Steel Industry" examines and analysis the development of Public Enterprises in India to highlight their role in the development of socialistic society and provide infra-structure for further industrial growth of the economy. To attain this objective, huge investments have been made in the Public Sector. Though, resources have been mobilised in different forms to finance the Public Sector projects, the future development of Public Sector Enterprises is subject to the surpluses to be generated by them from efficient operation.

The Chapter-II is devoted to prepare a framework for the study of productivity in Public Sector Enterprises with a view to examine the extent to which the factor inputs have been deployed efficiently in Public Enterprises. An appropriate methodology has been evolved for the measurement of productivity in Public Enterprises. The total factor productivity___approach has been found suitable by the Research Scholar for empirical investigation. The total factor productivity includes capital input, labour input and overall efficiency of the factor inputs respectiively over a given period of time.

The Chapter-III "Efficiency Profile of Public Enterprises", deals with the appraisal of operational efficiency of Public Sector Enterprises in conventional terms. The study would be useful to identify factors at work against attainment of higher productivity. A multipronged approach has to be adopted to deal with the malaise of poor and gloomy financial and physical performance.

Chapter-IV is concerned with the performance appraisal of Steel Industry in India. The analysis of the performance of Iron and Steel Industry brings forth the factors responsible for its failure to attain the optimum level of output. The main factors underlying the retarded production consist in idle capacity and low productivity.

Chapter-V is devoted to in-depth analysis of the problem of productivity in Public Sector Enterprises. The analysis shows that the productivity trend in Public Enterprises has been unsteady during the period under review. In other words, physical resources have not been used effectively by them.

Chapter-VI is concerned with the analysis of productivity trend in Iron and Steel Industry during the period under review (i.e. 1960-61 to 1985-86). Final Chapter-VII "Conclussions and Suggestions", I have suggested measures

to improve productivity of Public Sector Enterprises. Amelioration in productivity is Sine-quo-non for the fulfilment of social responsibilities of the Public Sector Enterprises.

LIST-OF-TABLES

CHAPTER - I

GROWTH OF PUBLIC SECTOR ENTERPRISES IN INDIA WITH SPECIAL REFERENCE TO IRON & STEEL INDUSTRY

The emergence of public sector in India is associated with the Socialistic objective of planned economic growth and the framing of various policy resolutions commensurate with it. Currently Public Sector Undertakings occupy a significant role in the industrial development of India, thus leading to overall economic growth.

Under the British rule, India had suffered vast economic exploitation due to external aggression and reluctance of Britishers towards industrialisation in this country. On the contrary, the handful capitalists were also hostile to working class and thus exploited them to their maximum possible end. As a result, the economic disparities widened. It was here only the concept of "Public Ownership" and "Socialism" emerged out to emancipate the working class from the dreadful clutches of the capitalists. The concept of "Socialism" further gave birth to the notion of "balanced economic planing" through central and state Government's active participation for establishing key industries in the country. Many committees were appointed

for deliberations regarding the industrial growth and development before the outbreak of second world war but proved of not much significance. Several non-official plans were also putlished viz. Bombay plan (1944) people's plan and Gandhian plan. All had the similar aims of developing cottage and agriculture industry in India. The department of Planning and Development issued statement on industrial policy of government in April, 1945 for direct control of industries being ordonance factories, Railways,Post and Telegraphs and other Public utilities air-craft automobile chemicals and tyer, Iron and Steel electrical machinery, machine tools, electro-chemical etc.

After the attainment of independent it became essential to cure the evils of "arrested development". The Indian economy was crippled baaly during the colonial role. It had made a grave impact upon production and prices. The production was steadily declining which ultimately lead to soaring of prices. However, labour unrest and division of the country further weakened the industrial set up of the country. All these factors forced the government to frame industrial policy in 1947 which recommended for planning of the economic resources with justice, equality and democracy. It further recommended for fixation of ceiling of incomes, widest diffusion of apportunities through an economy-based industrialisation and national regional self sufficiency.

The Industrial Policy Resolution of 1948 (April), recognised the vital role of Public Sector in India. It was envisaged under the resolution that "the state can make a deliberate and conscious effort towards economic development by entering the field of economic activities and can bring about the needed development in critical areas. Also the public enterprises are used as the source of finance of the plan outlay. Further public Institutions are the media through which the concept of welfare economy is realised practically.[1] The Public Sector Enterprises (PES) also facilitated job opportunities for the unemployed mass of the country. The resolution of 1948 also stated that "the nation has now set itself to establish a social order, where justice and equality of opportunity shall be secured to all the people in the present State by national economy the mass of the people are below subsistence level, the emphasis should be on the expansion of production a mere redistribution of existing wealth would make no essential difference to the people and would merely mean the distribution of poverty.[2] This resolution also puts

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1. Khan, Mohd.Asif Ali, "Pricing System in Public Sector Enterprises of India with Special Reference to Iron & Steel Industry," Thesis (unpublished), p. 2.
2. Ibid Chapter - I

limitations to the actives role of the State in the development of the industries in terms of mechanism and resources which "may not permit public order to participate in industry as widely as desirable.[3] Industries were divided into three categories :-

1. Those which would be more or less government's monopoly viz. manufacturing of arms atomic energy Railways etc.

2. Those which would normally be open to private enterprises, but the State would not hesitate to intervene whenever the progress of an industry is unsatisfactory; and

3. Those which would be subject to the central regulation and control, namely Coal, Iron and Steel, Air-Craft manufacturing, Ship-building, Minerals and Oil etc.

The planning Commission gave concrete form to the industrial policy in 1952. The Commission specifically referred to Industrial Policy statement to reiterate the relative sphere of activities of public and private sectors.

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3. Ibid Chapter - I

INDUSTRIAL POLICY RESOLUTION 1956

Avadi Session of Indian National Congress, 1956 put its seal of approval to "Socialistic pattern of Society as an objective of Indistrial policy. The resolution passed at the Avadi Session Stated that inorder to realize the objective of Socialistic pattern of Society it was essential to expand the public sector. This would provide economic foundation for increasing opportunities of gainful employment and improving living Standards and working conditions of the masses. It would also reduce disparities in income and wealth prevent private monopoly and cocentration of economic power in the hands of small number of individuals. Accordingly the State must progressively assume a predominent and direct responsibility in setting up new industrial undertakings and for developing transport facilities.[4] Resolution reclassifies industries under three categories :-

A - Industries for whose development the State is exclusively responsible.

B - Industries left to the initiative and enerprises of the private sector; and

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4. Opcit, Ibid, 3, Chapter I.

C - Industries which would be progressively state-owned but in which private sector would also continue to operate.

The resolution observed that "inevitably there will not only be an area of overlapping but also a great ceal of devetailing between industries in private sector and public sector.[5]

OBJECTIVES OF PUBLIC ENTERPRISES

The role of Public Sector has been exclusively defined in the constitution of India as per article 39(b) and (c) to ensure that the ownership and the distribution of material resources serve the common good and there is no Industrial Policy Resolution of 1956 envisaged that all the industries of basic strategic importance or in the nature of public utility services are to be dealt with in the Public Sector. The second plan conferred that the two sectors should function jointly. The third plan intended to determine the character and functioning of the economy of fourth plan envisaged its emergence as the

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5. Narayan, Laxmi, "Principles and practice of Public Enterprises Management", 1980, P.23.

dominant and effective area of the economy. The fifth plan envisaged to steer the distribution of essential commodities by making provision for infrastructural facilities. In the sixth plan, Central enterprises other than the Railways, Posts and Telegraphs were expected to generate a surplus of Rs. 800 crores. It placed responsibility on the Government to rehabilitate sick units in the interest of workers. Hence the Public Sector has played a vital role to achieve the various Socio-economic goals, viz. to exert control on the economy; to supply goods and services of basic and strategic importance and to serve as a countervailing force to the growth of big business houses in the Private Sector; to generate surpluses for financing further economic development; to eliminate imbalances in the regional growth; and to generate additional employment.

GROWTH OF PUBLIC SECTOR

Indian economy is a "mixed economy" in which both public and private sectors operate together. The Public Sector constitutes the core of industrialisation and covers a vast sphere of industrial activities. Railways is the biggest Public Sector in the country both from the view point of employment and investment. Public Sector in India is having a lion's share in the total national investment.

The Public Sector in India is not bound by any dogma or doctrine, it is dynamic in nature. Initially, it was restricted to public utility services like water supply, transport, electricity and communication. Today it is a blessing for the bulk of the population having fulfilled the economic and social objectives, such as, Policy of self-reliance, equitable distribution of wealth and income, removal of poverty and imbalances in regional growth. Despite all the facts, Public Sector in India is plagued with several intircate problems which impede its fulfledged development.

Table-1 presents contribution of Public Sector enterprises to the plans. It is distinct from the table-1 that Public Sector enterprises have maintained a costant trend through out the plan period i.e. from First Plan to Sixth Plan 6% of the plan outlays approximately. Public Sector occupies cardinal place in National Economy in several sectors specially in the production of fuel, basic metal industries including non-farrous metals, fertilizers and also communication equipments. Table-2 presents an account of contribution by Public Sector enterprises to National Economy. It is obvious from the Table-2, that the Public Sector enterprises have largely contributed towards

enhancing the National Production. Public Sector accounts for 100% of the production of the coal, lignite and petroleum. Since coal mines were privately owned, its production in Public Sector in 1968-69 was 12.69 M.Ts. against the total of 71.40 M.T.S. a contribution of 17.7% to the total. The coal production in 1983-84 rose to 134.2 M.T.S. including Singareni Colliaries Ltd. also, against the total, national production of 138.39 M.T.S. a share of 96.97% to the total production in the economy. This considerable rise in the Public Sector's coal production is attributed to the nationalization of sizable number ofcolliaries in 70's. The lignite and Petroleum crude production has been hundred per cent in 1983-84 against 51% in 1968-69.

Another important Sector is basic metal industries which occupy key position in National economy. Basic metal industries include, Steel Ingot and Saleable Steel. The production of Steel Ingot in 1968-69 was 3.72 M.T.S. against the total national production of 6.51 - a share of 57.10% in 1983-84 the production of Steel ingots increased considerably to 5.96 M.T.S. against the total production of 7.93 M.T.S. in the national economy constituting 75.11% of the total. This lion's share of basic metal industries in the national economy itself speaks of

Public Sector's signi icance. The production of Saleable Steel in Public Sector also portrays a satisfactory picture with 74.2 % in 1983-84. Sharp increase of production of saleable Steel during a couple of decades represents the dominance of Public Sector Enterprises in the overall production of national economy.

The third vital segment of the Public Sector is Non-ferrous metal Industry covering four important units, that is Alumunium, Copper, Lead and Zinc. In 1983-84, the overall picture of these four units have been quite satisfactory in terms of production contributed towards national economy with 27.85% 100% . and 89.25% economy with 27.85% 100% and 89.25% respectively.

Fertilizer is the other significant industry in the Public Sector. However, its contribution to national economy has not been much as that of the industries mentioned previously because they are also privately owned and run on private basis. Its share in Nitrogeneous production was 47.65% in 1983-84, in phosphatic 27.34% in 1983-84 communication equipment industry's contribution is vital to the national economy with 100% of production in the Public Sector.

TABLE - 1

CONTRIBUTION OF THE PUBLIC SECTOR ENTERPRISE
FIVE YEAR PLANS

(Rs. crores)

Plans	Targets (1)	Actuals (2)	Col.2 as percentage of Plan Finance (3)
First Plan (1951-56)	170 (a)	115 (a)	-
Second Plan (1956-61)	150 (a)	167 (a)	-
Third Plan (1961-66)	550	435	5.1
Annual Plans (1966-69)	587	409	6.2 +
Fourth Plan (1969-74)	2,029	1,135	7.0 +
Fifth Plan (1974-79)	849 (b)	2,583	6.6 -
Sixth Plan (1980-85)	9,395 (c)	6,645	6.8 +
Seventh Plan (1985-90)	35,485 (d)	-	19.7 (c)

SOURCE :-

Planning Commission :

(1) Basic Statistics relating to the Indian Economy 1950-51 to 1975-76.

(2) Fifth Five Year Plan; 1974-79 Oct. 1976

(3) Sixth Five Year Plan: 1980-85

(4) Reserve Bank of India Report on currency and Finance.

(4) Reserve Bank of India Report on Currency and Finance.

Vol.II Statistical Statements, 1983-84 and

(5) Draft Seventh Five Year Plan.

Public Enterprises included of Railways, Posts and Telegraphs, I.D.C., AHC, REC, ADC, Central Power Generation Units and other Financial Institutions excluding the Reserve Bank of India.

(a) Includes Contribution of the Railways only, data for other Public Sectors enterprises not separately available.

(b) From Fifth Plan onwards, these datas are on gross basis; hence not comparable with the earlier plans, 1974-75 figures at current prices, other years data at 1975-76 prices.

(c) At 1979-80

(d) At 1984-85 price

(e) Targets as percentage of Plan Finance.

TABLE - 2

PUBLIC SECTOR CONTRIBUTION IN TOTAL INDUSTRIAL PRODUCTION

Items	Units	National Production		Public Sector's Production		% of Public Enterprises Contribution to Production	
		1968-69	1983-84	1968-69	1983-84	1968-69	1983-84
1	2	3	4	5	6	7	8
Fuel							
Coal	Million Tonnes	71.40	138.39	12.61	134.2*	17.7	96.97
Lignite	"	3.98	6.6	3.98	6.6	100.0	100.0
Petroleum Crude	"	6.05	26.03	3.09	26.03	51.1	100.0
Basic Metal Industries							
Steel Ingot	Million Tonnes	6.51	7.93	3.72	5.96	57.10	75.11
Saleable Steel	"	4.7	6.40	2.69	4.77	55.7	74.53

Items	Units	National Production		Public Sector's Production		% of Public Enterprises Contribution to Production	
		1968-69	1983-84	1968-69	1983-84	1968-69	1983-84
1	2	3	4	5	6	7	8
Non-Ferrous Metals							
Aluminium	Thousand Tonnes	125.3	220.29	Nil	61.34	-	27.85
Copper	"	9.5	35.37	-	35.37	-	100.0
Lead	"	1.9	15.42	1.9	15.42	100.0	100.0
Zinc	"	17.0	60.17	13.7	53.7	80.6	89.25
Fertilizers							
Nitrogenous	Thousand Tonnes	503	3485.0	391	1660.5	60.5	47.65
Phosphatic	"	213	1048.0	NA	286.5	NA	27.34
Communication Equipments							
Telephones	Number in Lakhs	NA	5.47	NA	5.47	NA	100.0
Tele printers	Numbers	5012	8149	5012	8149	100.0	100.0

*Includes Singareni Collaries Ltd.

SOURCE : Bureau of Public Enterprises, Public Ente prises Survey 1983-84, Vol.I, Government of India, New Delhi, P.2

I N V E S T M E N T

There has been a considerable growth of Public Enterprises in terms of number and investment during 1951 and 1984. The Table No. 3 reveals that total Capital investment in 1951 in five enterprises stood at Rs. 29 crores, which in the successive years rose to Rs. 35,411 crores. The Third Five Year Plan was a giant leap forward in respect of investment. The total investment in 1956 was Rs. 81 crores in 21 Public Enterprises, which increased to a sizeable amount of Rs. 953 crores in 48 Public Enterprises. Later on, each Five Year Plan provided for substantial investment in Public Enterprises, hence it kept on increasing considerably. As a matter of fact, the Government had paid special attention to the growth and development of Public Enterprises during 70's and 80's

The 80's and 90's have been the decades of remarkable growth of investment in 214 central public Enterprises, including seven insurance companies, stood at Rs. 35,411.00 crores, in 1984 as against Rs. 6,267 crores in 122 Central Public Enterprises in 1974. This shows an increase over the previous years under review.

It is worth analysing growth of investment in top ten Public Enterprises which claim major share of Capital outlays,

54 per cent of the total in 1984. They include Steel, Coal, National Thermal Power Corporation Ltd. (N.T.P.C.), Oil and Natural Gas Commission (O.N.G.S.), Rural Electrification Corporation Ltd. (R.E.C.L.), Fertilizer Corporation of India, (F.C.I.), Rashtriya Ispat Nigam Ltd., Kudremukh Iron Ore Company Ltd., Hindustal Fertilizer Corporation Ltd. and Shipping Corporation of India. The Table 4 shows the growth of investment in the ten Public Enterprises occupying the first ten positions in terms of investment as on March 31st, 1984. It is apparent from table 4 that these Public enterprises ranking in first ten positions have absorbed enormous amount of capital. In comparative analysis, Steel Authority of India Ltd. (SAIL) tops the list with an investment of Rs. 5,394 crores in 1984 followed by Coal with capital investment of Rs.4,057 crores.

However, share of above top ten public enterprises in investment has registered a marginal decline from 54.7% to 54.4% during 1983-84. In 1983 investment in these enterprises was of the order of Rs. 16,441 crores, out of the total of Rs. 30,038 crores.

TABLE - 3

GROWTH OF INVESTMENT IN PUBLIC SECTOR

(Rs. in Crores)

Year	No. of Enterprises	Investment
1.4.1951	5	27
1.4.1956	21	81
1.4.1961	48	953
1.4.1966	74	2415
1.4.1969	85	3092
1.4.1974	122	6237
1.4.1979	176	15602
1.4.1980	186	18225
1.4.1981	185	21102
1.4.1982	205	24916
1.4.1983	209	30038
1.4.1984	214	35411

SOURCE : Bureau of Public Enterprises, Public Enterprises Survey, 1983-84, Vol.I, Govt. of India, New Delhi, P.2

TABLE - 4

INVESTMENT IN TOP TEN PUBLIC ENTERPRISES

(Rs. in Crores)

S.No.	Name of the Enterprises	Investment as on 31.3.1984	Investment as on 31.3.1983
1	2	3	4
1.	Steel Authority of India Ltd.	5,394.17	4,898.57
2.	Coal India Ltd.	4,057.16	3,254.88
3.	National Thermal Power Corporation Ltd.	3,153.12	1,498.01
4.	Oil & Natural Gas Commission	2,031.19	1,955.88
5.	Rural Electrification	1,341.49	1,158.37
6.	Fertilizer Corporation of India	1,013.41	1,029.01
7.	Rashtriya Ispat Nigam Ltd.	957.06	510.48
8.	Kudromukh Iron Ore Company Ltd.	780.81	733.46
9.	Shipping Corporation of India Ltd.	748.53	686.21
	T O T A L	19,252.08	16,441.09

SOURCE : Bureau of Public Enterprises, Public Enterprises 1983-84, Vol. I, Govt. of India, New Delhi, P.2

PATTERN OF INVESTMENT

To gear up industrialisation and reach the stage of economic development by begining of 21st Century, the Government has been making heavy investments in twelve (12) basic industries which fall in the category of enterprises producing and selling goods, eight (8) industries of enterprises, rendering services and the insurance companies. The group-wise break up of investment in Table-5 reveals producing and selling enterprises claiming 79.40% of the investment in 1983-84. It is marginally on the lower side as compared with 79.50% of total investment in 1982-83. However, in absolute terms, the investment has been kept up . Additional investment in 1983-84 in manufacturing enterprises was of the order of 4234 crores. The enterprises rendering services which comprise, eight (8) industries in Public Sector were provided capital investment of Rs, 5,426.5 crores, that is 15.33% of the total. It is also less than that of the previous year. Yet,the investment in absolute terms in the year 1983-84 was larger by Rs. 46.44 crores. In a few words, main emphasis of government policy is on the development of basic industries.

which supply inputs to other industries. Self sufficiency in input, including technology is a key note of current investment policy of the Public Enterprises.

Change in the pattern of investment becomes more pronounced when a comparison is drawn between 1972-73 and 1982-83. A period of decade is marked by a fall in the share of enterprises producing and selling goods; Investment from 84% to 80%. The Steel Industry got a reduced share in 1982-83 as compared with 1972-73, its share in investment in 1972-73 was 33% which was reduced to 17% in 1982-83. Steel, which is a capital intensive industry got fresh investment only for modernisation of the existing plants. The other industries in the group, also followed suit with the only exception to the norm were heavy engineering indluding medium and light industries and coal where increase in investment are made. The coal industry in 1972-73 was largely in private sector, heavy engineering industry was developed for indigenous production of capital goods. There is also emphasis on the development of agro-based industries for rural development.

Service Enterprises did not witness any change in the pattern of investment during the decade 1972-73 and 1982-83. The insurance companies also maintained the same pattern.

TABLE - 5

PATTERN OF INVESTMENT IN PUBLIC ENTERPRISES

(Rs. in Crores)

Sl. No.	Cognate Groups	No.of Enterprises as at the end of 1983-84	No.of Enterprises as at the end of 1982-83	Investment as at tne end of 1983-84	Investment as at tne end of 1982-83	Increase in Amounts	Share in Total Investment % of 1983-84	Share in Total Investment % of 1982-83	Change in Investment pattern
1	2	3	4	5	6	7	8	9	10
1.	Enterprises Under Construction	6	9	1,747.18	1,075.53	671.65	4.93	3.58	
2.	Enterprises Production and Selling Goods :-								
	(i) Steel	6	6	5,717.24	5,146.94	570.30	16.15	17.14	-0.99
	(ii) Minerals & Metals	13	13	2,936.79	2,639.45	297.34	8.29	8.79	-0.50
	(iii) C o a l	5	5	4,068.82	3,268.01	800.81	11.49	10.88	+0.61
	(iv) Power	2	2	2,510.71	1,791.81	718.82	7.09	5.97	+1.12
	(V) Petroleum ..	12	12	3,774.24	3,034.12	740.12	10.66	10.10	+0.56
	(vi) Chemicals, Fertilizers and Pharmaceuticals.	25	22	3,992.74	3,918.98	173.76	11.28	12.71	-1.43
	(vii) Heavy Engineering	14	14	1,651.69	1,433.46	218.23	4.66	4.77	-0.11
	(viii) Medium & Light Engineering	20	19	587.47	495.19	92.29	1.66	1.65	+0.1
	(xi) Consumer Goods ...	10	10	801.36	691.13	110.23	2.26	2.30	-0.46
	(x) Transportation Equipment	12	11	1,178.84	816.61	362.73	3.33	2.72	+0.61
	(xi) Agro based	10	10	36.20	30.59	5.61	0.10	0.10	-0
	(xii) Textiles	13	12	860.07	717.57	144.50	2.43	2.38	+0.65
	T O T A L :	146	140	28,116.17	23,881.94	4234.23	79.40	79.50	-0.10

Table continued .....

(Rs. in Crores)

Sl. No.	Cognate Groups	No.of Enterprises as at the end of 1983-84	No.of Enterprises as at the end of 1982-83	Investment as at the end of 1983-84	Investment as at the end of 1982-83	Increase in Amounts	Share in Total Investment % of 1983-84	Share in Total Investment % of 1982-83	Change in Investment pattern
1	2	3	4	5	6	7	8	9	10
3.	Enterprises Rendering Services :-								
(i)	Trading and Marketing Services	19	18	823.17	293.79	29.38	2.33	2.64	-0.31
(ii)	Transportation Services	9	9	2,194.81	2,089.98	104.83	6.20	6.96	-0.76
(iii)	Contract & Construction services.	7	7	265.84	244,09	21.75	0.75	0.81	-0.66
(iv)	Industrial Development and Tech. Consultancy Services	11	10	94.19	88.24	5.95	0.27	0.3	+0.24
(v)	Development of Small Industries.	71	1	47.86	38.96	8.90	0.14	0.13	+0.01
(vi)	Tourist Services	2	2	81.85	78.29	3.56	0.23	0.26	-0.3
(vii)	Financial Services	3	3	1,835.75	1,546.80	288.95	5.18	5.15	+0.3
(viii)	Companies Registered Under Section (25).	3	3	83.06	78.89	4.17	0.23	0.26	-0.03
	T O T A L :	55	53	5,426.53	4,959.04	467.44	15.33	16.51	-1.18
4.	Insurance Companies	7	7	121.00	121.00	-	0.34	0.40	-0.06
	GRAND TOTAL :	214	209	35,410.88	30,037.51	5,373.37	100.00	100.00	

SOURCE :1.BPE's Report, "Public Enterprises Survey 1983-84, Government of India, New Delhi, P. 166.
2.Change in Investment Pattern has been computed by Research Scholar.

TABLE - 5 (A)

PATTERN OF INVESTMENT IN PUBLIC ENTERPRISES
(1972-74 & 1983-84)

(Rs. in Crores)

Sl. No.	Cognate Groups	Units 1972-73	Investment 1972-73	Units 1982-83	Investment 1982-83	Share in Total Investment 1973 %	Share in Total Investment 1983 %	Change in the share in total investment over 1973 %
1.	Enterprises Under Construction ...	-	-	9	1,075.53	-	3.58	+3.58%
2.	Enterprises producing & Selling goods :-							
	(i) Steel ...	NA	1,840.27	6	5,146.94	33.52	17.14	-16.38%
	(ii) Minerals/Metals	-	720.84	13	2,639.45	12.94	8.29	- 4.65
	(iii) C o a l	-	-	5	4,068.82	-	10.88	+10.88
	(iv) Power	-	NA	2	1,791.89	-	5.97	+ 5.97
	(v) Petroleum ...	-	378.35	12	3,034.12	6.79	10.10	+ 3.3
	(vi) Chemical, Fertilizers and Pharmaceeuticals.	-	690.91	22	3,818.98	12.40	12.71	0.31
	(vii) Heavy Engineering	-	657.38	14	1,433.46	11.80	4.77	- 7.03
	(viii) Medium and Light Engineering	-	122.50	19	495.19	2.20	1.65	- 0.55
	(ix) Transportation Equipment.	-	201.20	11	816.61	3.61	2.72	- 0.89
	(x) Consumer goods	-	52.24	14	691.13	0.94	2.30	+ 1.36
	(xi) Agro-based.	-	7.99	12	715.57	0.15	2.38	+ 2.23
	T O T A L :	-	4,671.85	140	23,881.94	83.87	79.50	- 4.37

Table continued ...

(Rs. in Crores)

Sl. No.	Cognate Groups	Units 1972-73	Investment 1972-73	Units 1982-83	Investment 1982-83	Share in Total Investment 1973 %	Share in Total Investment 1983 %	Change in the share in total investment over 1973 %
3.	Enterprises Rendering Services :-							
	(i) Trading & Marketing Services	NA	292.58	18	793.79	5.25	2.64	-2.61
	(ii) Transportation Services	NA	421.96	9	2,089.98	7.57	6.96	-0.61
	(iii) Contract & Construction Services	NA	15.77	7	244.09	0.28	0.81	+0.53
	(iv) Industrial Development and Consultancy Services	NA	5.99	10	88.24	0.11	0.3	+0.19
	(v) Development of Small Se Industries	NA	29.64	1	38.96	0.53	0.13	-0.40
	(vi) Tourist Services	NA	14.46	2	78.29	0.26	0.26	0
	(vii) Financial Services	NA	58.24	3	1,546.86	1.05	5.15	+4.10
	(viii) Co. Registered under Section 25.	NA	NA	3	78.89	-	0.26	+0.26
	T O T A L :	NA	838.64	53	4,959.04	15.05	16.51	+1.46
4.	Insurance Company	-	-	7	121.00	0.57	0.40	-0.17

NOTES :- 1. Includes equity (paid up) capital and long term loans.
2. Figures in percentage share has been compounded by Research Scholar.

SO SOURCE:- Compiled from Reports of B.P.E's of various years.

SOURCES OF INVESTMENT

Broadly speaking, Public Enterprises are largely assisted by Central Government with State Government, Foreign Investors, the institutional investors and Private investors. The Table-6 reveals Central Government providing 79.74% of the investible funds to Public Enterprises till 31st of March, 1984. 10% of the investment is provided by the private individuals investors, Indian Foreign participation in the form of equity and loan is limited to 7.8%. However, the financial institutions have made insignificant contribution to the capital of Public Enterprises; their share in investment being 2.45%. The reason for financial institutions investing small funds lies in their active participation of the private sector who are not to be left high and dry for lack of capital.

A comparison between funds from different agencies during 1983 and 1984 is also drawn in Table-6. The comparative analysis shows marginal decline in the Central Government's share in investment. The State Government also has allowed a marginal decline in its share in investment of PES. The private investors have, of course, stepped up their investment in P.E.S. quite significantly

increase of 1.16% in one year. It seems a positive response by individual investors to various incentives provided by the government in its fiscal policy. There is little change in the investment by financial institution and fofeign investors. However, the Central Government still dominates the invest-ment in Public Enterprises.

INTERNAL RESOURCES

The Public Enterprises have become growingly aware of the significance of internal financing. The internal resources of Public Enterprises include depreciation funds and retained profits. Table-7 shows more of the funds generated internally. In 1974-75, 91 Public Sector undertakings (PSU's) had generated funds of Rs. 580 Crores, while in 1983-84, 116 units had built up funds from internal sources worth Rs. 3,282 crores. The Table-8 indicates that these funds have been created largely from retained profits. In 1979-80, retained profits were 1/3 or 33% of the total 67% of the internal funds were accounted by depreciation reserves. The noticeable change came about in the later period; retained profits constituted 51% of the total internal funds. The success of Public Enterprises lies in more financing of their activities with retained profits.

The information given in Table-8 explains as to how the internal funds were utilised. The Public Enterprises have been using internal funds broadly for two purposes; one for the repayment of loans to Central and State Governments and the second for financing modernisation and expansion of the existing plants. In 1979-80, 80% of the internal funds were reinvested as a policy of more profits in the future, the remainder was utilised in repaying loans. Similarly, 1983-84, public enterprises reinvested 67% of the internal funds and utilised 33% in reducing the loans.

TABLE - 6

SOURCES OF INVESTMENT

1 : 0.7[illegible]

(Rs. in Crores)

Sources	As on 31.3.1984			As on 31.3.1983		
	Equity	Loans	Total	Equity	Loans	Total
	1	2	3	4	5	6
1. Central Govt.	16,573.79	11,666.79	28,239.98	14,007.99	10,211.02	24,219.01
2. State Govt.	23.27	7.64	30.91	21.40	5.33	26.73
3. Foreign Participation/Loans including deferred credits.	39.85	2,717.80	2,757.56	33.14	2,349.01	2,382.15
4. Financial Institutions (Indian)	24.88	819.73	844.61	24.07	729.38	753.45
5. Private Participation (Indian)	23.69	3,514.04	3,537.73	20.53	2,635.64	2,656.17
T O T A L :	16,685.48	18,725.40	35,410.88	14,107.13	15,930.38	30,037.51

SOURCE : BPE's Report, 1983-84

TABLE - 7

INTERNAL RESOURCES GENERATED

(Rs. in Crores)

Year	No. of Enterprises	Resource generated
1974-75	91	580
1975-76	98	525
1976-77	101	719
1977-78	96	708
1978-79	106	906
1979-80	113	1030
1980-81	102	1225
1981-82	110	2261
1982-83	115	2753
1983-84	116	3282

SOURCE : BPE's Report, 1980-81, 1981-82, 1983-84

TABLE - 8

INTERNAL RESOURCES GENERATION 1979-80 to 1980-81

(Rs. in Crores)

Year	No.of Enterprises generating internal resources	Details of Internal Resources				Loans repaid			Net resources available for reinvestment
		Depreciation	DRE Written off	Retained profits	Total	Central Govt.	State Govt.	Total	
1	2	3	4	5	6	7	8	9	10
1979-80	113	616.82	76.13	336.96	1,029.41	219.72	1.50	221.22	808.69
1980-81	105	736.78	64.43	413.11	1,214.32	146.46	.45	146.89	1,067.43
TOTAL :		**1,353.60**	**140.56**	750.07	2,244.23	366.18	1.95	368.11	1,876.12
1981-82	110	1,052.53	55.46	1,153.32	2,261.31	335.94	2.50	338.44	1,922.87
1982-83	115	1,382.38	56.31	1,314.04	2,752.73	500.45	0.46	500.91	2,251.82
1983-84	116	1,640.57	77.61	1,564.01	3,282.19	450.64	0.75	541.39	2,830.80

SOURCE : B.P.E. Reports 1981, 1982 Vol.II. 1982,83 Vol.I and 1983-84 Vol.I

A C H I E V E M E N T S

A. CONTRIBUTION TO DOMESTIC PRODUCTS & SAVINGS :-

Growth of Public Sector can be measured in terms of its shares in domestic products and savings. The Public Sector which has emerged as a significant segment of national economy has contributed substantially to the national economy. Its savings has also grown in size. The basic data for analysis are presented in Table-9. The gross domestic product has increased from Rs. 36.617 crores in 1970-71 to Rs. 1,453.28 crores in 1983-84. The net increase during the period in gross domestic product has been of the order of 25%. The PublicSectors gross domestic product has also registered substantial increase during the period under review. The value of products of the Public Sector at market prices actually increased from Rs. 5,456 crores in 1970-71 to Rs. 34,588 crores in 1982-83; showing an increase of 44% per annum. It, thus, becomes obvious that growth of national income largely depends upon the growth of Public Sector. The picture does not alter when gross domestic product is converted into net domestic product after allowing for depreciation and tax. When we focus our attention to relative share of Public Sector and Private Sector, in both the gross and

net domestic products, the table reveals that Public Sector have generated 20% of the national income during the period under review. The trend in Public Sector's shares in domestic products have followed an upward direction. In 1970-71, the share of Public Sector was 14.5% which increased to 25.5.% in 1982-83.

Savings are most important part of national income which actually spearhead progress and development. The overall growth in savings during 1970-71 and 1983-84 was 46% in contrast with the growth in public sector's savings of 45%. The average share of Public Sector, thus, is quite sizeable. Public Sector on average provided 20% of the total gross savings. The picture is slightly different when gross savings are converted into net savings. The share of Public Sector in net savings is 18% because of the lower rate of growth of net savings viz. 32%. The whole economy has registered 48% growth of net savings.

Public Sector enterprises have been performing an admirable social objectives to create more employment opportunities. Public Sector generated employment more than the whole economy. The growth rate for employment in Public Sector during the preceding 14 years was 3.7% as compared with 2.4% for the whole economy, vide Table-10.

In 1971 total employment of Public Sector was 13.32 crores which increased to 16.28 crores till December,1985. Total number of workers in both the Sectors Public & Private was 17.7 crores in 1971 which increased to 23.81 crores till December, 1985. Thus, the growth rate of employment was higher than in national economy as a whole. The concern of Public Sector with creation of more job has resulted in its increasing share in total employment. In 1971, the share of Public Sector in employment was 61% which increased to 68.4% in December,1985. The average share of the Public Sector in total employment is 65%. It is apparent from this account that Public Sector is a major employer.

TABLE - 9

PUBLIC SECTOR'S SHARE IN DOMESTIC PRODUCT AND SAVINGS (AT CURRENT PRICES)

(Rs. in Crores)

Items	Public Sector	Entire Economy Sector	Contribution of Public Sector
Gross domestic products			
1970-71	5,456	36,617	14.9
1975-76	12,220	66,413	18.4
1979-80	20,032	97.051	23.8
1982-83	34,588	1,45.328	23.8
Average ...	44%	25%	19.5%
Net domestic products			
1970-71	5,007	34,531	14.5
1975-76	11,374	62,495	18.2
1979-80	18,024	84,237	21.4
1982-83	31,483	1,37,970	23.5
Average ...	44%	25%	19.5%

(Rs. in Crores)

Items	Public Sector	Entire Economic Sector	Contribution of Public Sector
Gross domestic products Savings			
1970-71	1,253	6,783	18.5
1981-82	7,277	32,665	22.3
1982-83	8,231	37,322	22.1
1983-84	7,971	44,172	18.0
Average ...	45%	46%	20.3%
Net domestic products Savings			
1970-71	804	4,566	17.6
1981-82	4,712	22,985	20.6
1982-83	4,929	26,080	18.9
1983-84	3,900	31,031	12.6
Average ...	32%	48%	18%

SOURCE : Mishra, R.K. and Ravishankar, S. "Public Sector Enterprises growth and Objectives "The Economic Times, July, 12, 1985.

TABLE - 10

SHARES OF PUBLIC SECTOR EMPLOYMENT IN MAJOR INDUSTRIES & SERVICES

End of March	Public Sector	Total	Share of Public Sector in Total Employment
1971	10:32	17:74	61.4
1976	13:32	20:14	66.0
1980	15:08	20:31	67:6
1981	15.48	22.88	67.7
1982	15.95	23.49	67.9
Dec. 1985	16.28	23.81	68.4
	3.7%	2.4%	65%

SOURCE : Mishra, R.K. and Ravi Shankar, S. and Article Entitled, "Public Sector Enterprises, Growth and objectives, "The Economic Times, July, 13, 1985.

CONTRIBUTION TO EXCHEQUER

Public Sector is contributing to the National Exchequer in two forms, dividend and taxes. The payment of profit to the State as dividend and payment of corporate taxes both are the index of its success in generating surplus for financing developmental activities in the economy elsewhere. The sizeable increase in share of national domestic product has led to payment of ever increasing amount of excise duty and customs duty. Table-11 presents contribution of Public Sector through Central Exchequer. Total contribution of Public Sector for 1975-76 was Rs. 1,196 crores of which Rs. 198 crores were in the form of dividend and corporate taxes. 84% of its was by way of excise duty. In the last year of my study, 1983-84, contribution of Public Sector to the national exchequer of was Rs. 6,566 crores of it, the Public Sector Enterprises paid dividend of Rs. 133 crores and corporate taxes of Rs. 1,239 crores which contribute 21% of the total payment. Payment by way of excise duty and Customs Duty were 79% of total. Thus, growth of Public Sector in terms of its contribution to national exchequer since 1975-76 is land mark in history of Public Sector's achievement. Now it

shows an awareness on the part of Public Sector to surplus which they should generate for financing further development programmes.

The Public Sector undertakings in India gathered momentum for speedy growth and development during the pland period and consolidated gains both in physical and financial terms especially during eighties. They gained enormous impetus to the growth and expansion in several fields. Now the Public Sectors produce not only important and strategic goods but also helps effectively in stabilising the supplies and prices of essential commodities to the consumers.

From eighties onwards, Public Enterprises made steady improvement in all directions including augemented investment growth, higher production, increased volume of turnover, larger profits (before tax), large export earnings, more generation of internal resources and also sizeable contribution to the national exchequer in the form of dividend and taxes. Similarly, the Public Sector Undertakings (PSU) stretched out its positive assistance to meeting the social, economic and financial objectives by providing considerable gamut for increased production, adequate return on investment,

more employment, balanced economic growth and development of ancillary industries in Private Sector. Public Sector has, thus, assumed a crucial role in the process of industrialisation of the country.

However, it cannot be positively asserted that all is well with the Public Sector. The Public Enterprises are plagued with a number of malice under-mining their productivity. It consitutes subject matter of subsequent chapters.

TABLE - 11

CONTRIBUTION TO THE CENTRAL EXCHEQUER

(Rs. in Crores)

Year	Dividend	Corporate Taxes	Excise Duty	Customs Duty	Other Duties	Total
1975-76	21	187	998	NA	NA	1,196
1976-77	50	287	1,089	NA	NA	1,376
1977-78	58	281	1,230	NA	NA	1,539
1978-79	72	225	1,756	707	127	2,887
1979-80	76	299	2,168	782	214	3,539
1980-81	89	221	2,000	902	223	3,429
TOTAL	360	1,410	9,241	2,391	564	13,966
1981-82	109	590	2,252	1,315		4,566
1982-83	115	928	2,667	1,827(A)	NA	5,537
1983-84	133	1,239	3,455	1,739(B)	-	6,566

(A) -
(B) - Includes both Customs and other duties.

SOURCE : 1980-81 BPE Report, Vol. I, P.10
1981-82 BPE Report, Vol. I, P.8
1982-83 BPE Report, Vol. I, P.11

IRON AND STEEL INDUSTRY IN INDIAN ECONOMY

The Five Year Plan provide main stay for planned and steady industrial development. Iron and Steel Industry is one of the core industries which has received adequate attention for planned expansion with a view to attaining rapid economic growth. The Iron and Steel Industry was accorded cardinal place, because it provides sinero for industrial development. Stressing the role of Iron and Steel Industry. Second Plan stated that "the expansion of Iron and Steel Industry has obviously the highest priority, since more than any industrial product, the levels of production in these materials (Iron) determines the tempo of progress of the economy. Diverse types of fabricating facilities have to be created to promote the production of wide range of items.... the creation of basic facilities such as the establishment of heavy foundaries," forgings and structural shops is imperative.[1]

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1. The Second Five Year Plan, P. 43.

GROWTH AND DEVELOPMENT

The tradition of Iron production in India is associated with the Ladyrinth of hoary antiquity. The metal is referred to Vedic Literature as "AYAS". Tools and equipments used for steel making in ancient period present a glaring example of its astonishing antiquity and ingenuity. "The Greek and Latin writings serve to the example that they were familiar with the use of steel, but they appear to have been altogether ignorant of the mode by which it was prepared from iron. The edges of the cutting instruments of ancients were all formed of alloys and could not have been employed in sculpturing porphysy and syenite."[1].

Sir Robert Hadfield held the opinion that "the stone works of Egypt could only have been carried out with the tools of Iron, probably cemented or hardened steel."[2] Many Scholers on the subject hold the opinion in concensus that the famous Damascus Steel was transported from different inaccessible Indian villages located in Madras and Hyderabad (Nirmal). Traders from Damascus had a regular visit to

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1. J.M.Heath "On Indian Iron and Steel", Journal of Royal Asiatic Society Vol. 1839, PP.390-397.
2. Sir Robert Hadfield, "Sinhalese Iron and Steel of Ancient Origin", Journal of Iron and Steel Institute, 1912, PP.134-186.

things places to acquire the raw material for the manufacture of weapons etc. The "Ain-e-Akbari", a Chronicle of life, events and history of the great Mughal, is said to be superb account of Indian Steel production.

Crude furnace for smelting of Iron ore had been in vogue in the sub-continent for atleast 3,000 years. The practice was given up in the 19th Century with the advent of British rule and also the occurrence of technological advancement in Europe. Debacle of Marathas and Sikhs power during the first half of the 19th Century also caused major constraints in the production of steel. The market d windled for armaments, in which Indian Iron and Steel had excelled.

Many attempts were made for setting up Indian Iron works by adopting techniques quite similar to those used in the west. Barring a few, most of those schemes met with fiasco. The main reasons for the failure of European technique of Steel making in India were the use of charcoal, insufficient capital, lack of demand and the unwillingness of the Government to protect the industry from foreign competitors. Charcoal which was being consumed by most of the plants resulted in higher cost of production than coke. As a result, the Indian Iron became less competitive. Many

schemes for indigenous Steel Industry languished for capital because they had restricted access to additional sources of funds. The Central Government and the respective Provincial Governments were reluctant to extending their support to those ventures. The problems of Indian Iron works were compounded by lack of requisite managerial and technical skills as well.

In 1899, Jamshedji Tata, Bombay merchant and Textile Mills Owner promoted an idea for setting up Iron and Steel Mills in India. With all necessary formalities within three years he wasready to take a contract with an American firm for the designing of plant and to undertake survey for its location. In 1906 the Mill came into being at SAKCHI, now Jamshedpur in Bihar and was named after its founder as TATA IRON AND STEEL COMPANY (TISCO) its subsidiaries and other factories were also set up nearby to supply the works or to consume its steel. Thus TISCO became the first successful Iron and Steel Mill established in early 20th century.

TISCO enjoyed full co-operation of the Government in its promotion and expansion programmes. In addition TISCO was careful to avoid all those factors which had earlier caused failure of Indian Iron and Works. TISCO was

successfully growing speedily. In 1917, it attained four-fold increase in its output. Its output was 10,000 tonnes of finished steel in 1917 and in 1939 it rose to 800,000[3] Tonnes. Thus TISCO became one of the largest steel mills in the British Empire and also became the cheapest producer of steel in the world. It was encouragingly surprising that TISCO produced 3/4th of steel consumed in India.

In 1918 two more Companies were established viz; Indian Iron and Steel Company (TISCO) and Mysore Iron and Steel Works (MISW) first at Burnpur in Bengal with the support of British Government and the second at Bhadravati was sole effort of Maharaja of Mysore.

India had dominated in the sphere of Steel production until the mid 1950's. After 1954, it lagged behind demand. The reasons were attributed to the significant increase in consumption level and a small increase in production. In 1945, the Government set up the Iron and Steel (major) Panel to probe into India's Steel Industry and to recommend programmes for its future growth and development. In 1946, the panel recommended two mills with the initial capacity of 5 million tonnes. Under the terms of Indian Industrial

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3. William,A. Johson""The Steel Industry of India" p.15

Policy Resolution 1948 of the Government, both mills were to be erected by the Government of India. Currently, India's existing mills began preparation for expansion.

DEVELOPMENT OF IRON & STEEL INDUSTRY

(1) Steel-Industry During Plan Period :-

Under the First Five Year Plan the significance of developing Iron and Steel Industry was realised. Provision was made in the plan for erection of new Public Steel Mills having a capacity of 800,000 tonnes of pig iron and a minimum capacity of 3,50,000 tonnes of finished Steel per year. But the formulation of this project could not be possible at the time of launching the First Five Year Plan, though it was believed that the Mill could be able to produce pig iron by 1956. Moreover the plan considered a 59% increase in the joint capacities of TISCO and IISCO during this period.

However, during the First Five Year Plan, the private existing mills undertook heavy expansion programmes yielding satisfactory increase in the capacity of Iron and Steel Industry. Although the Government had started preparations

for the establishment of three new Public Steel Plants by the year 1956, no new mill came into existence during the plan period. TISCO embarked upon relatively modest modernisation and expansion programmes in 1951 for an increase in its saleable Steel capacity from 7,80,000 to 9,31,000 tonnes by 1957. The plan had primary aim of rehabilitating TISCO's plant, which has been subject to enormous deterioration during the Second World War. In addition the other leading producer, at that time, IISCO, set about a programme in 1950, which was designed to permit fuller use of its capacity to augment its finished production to 3,50,000 tonnes. It was largely complete by 1953. The other expansion programme was also contempleted to increase IISCO's finished steel capacity to 4,00,000 tonnes in 1953, but this project could not be completed until 1958.

However, inspite of increased steel production during the period domestic supply was not sufficient to meet the demand fully. It is clear from the Table No.12 that production of finished Steel was 10,19,000 tonnes in 1950. It increased to 14,39,000 tonnes in 1958. The increase was not sufficient to satisfy the increasing demand for steel. IISCO only was able to affect increase in finished steel production. Hence in order to cope with the domestic

requirements the Government was inclined to increase imports of finished Steel towards the end of plan period.

The import and export of the finished steel in India, are shown in Table No.13. The Table also reveals the total production of finished steel in three Public Sectors steel plants and others (TISCO, IISCO and MISW) during the period 1946 and 1970.

Production of steel which registered fourfold increase during 1946-47 and 1969-70 was not sufficient for the domestic requirements. Production which was 9,05,000 tonnes in 1946-47 fell short of domestic requirements by 31,000 tonnes.[5] In 1955-56 the last year of first plan the gap between the domestic supply and demand was of the order of 2,99,000 tonnes. It shows that TISCO and IISCO, inspite of expansion programme, were not able to cope with the domestic demand.

Had a new mill been started in the late 1940s or early 1950s, the plant would have been able to produce steel by 1956 and avoid the substantial increase in the steel import.

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5. The domestic requirements is calculated by adding imports to total production and substracting export

Moreover, the cost of mill would have been 60% less than the total average cost of the three new mills eventually established. The apparent costs of delay, were, thus quite substantial.

The main causes for the belated investment and expansion of capacity were ascribed to the Government's reluctant attitude in formulating appropriate policies towards the Iron and Steel Industry. The Government controlled and regulated almost every activity of the industry. For instance, the distribtion of most types of steel within the country, the amount of steel for import and thetypes of steel to be rolled by the integrated mills were determined by the office of the Iron and Steel Controller, a sub-division of the Ministeries of Steel and Heavy Industries. Wages were also indirectly influenced by the Central Government and dismissals were circumscribed by the laws of the States. Furthermore, the existing plants had to take licenses from the Government for new investment. Finally, the prices of the Iron and Steel products were fixed by the Ministry responsible for the industry. Thus, the Government control was responsible for the retarded investment during this period.

TABLE - 12

PRODUCTION OF PIG IRON, INGOTS STEEL AND FINISHED STEEL IN INDIA DURING 1948-70

In '000 tonnes.

Years.	Pig Iron	Steel Ingot	Finished Steel.
1948	1,488	1,254	866
1949	1,637	1,351	938
1950	1,687	1,437	1,019
1951	1,829	1,503	1,091
1952	1,843	1,476	1,118
1953	1,798	1,505	1,040
1954	1,951	1,682	1,264
1955	1,913	1,673	1,280
1956	1,960	1,723	1,859
1957	1,932	1,693	1,438
1958	2,109	1,795	1,439
1959	3,100	2,450	1,795
1960-61	4,405	3,418	2,337
1961-62	5,156	4,285	2,939
1962-63	6,220	5,395	2,864

In '000 tonnes

Year	Pig Iron	Steel Ingot	Finished Steel
1963-64	6,589	5,945	5,347
1964-65	6,728	6,238	4,508
1965-66	7,208	6,526	4,604
1966-67	7,090	6,610	4,551
1967-68	6,958	6,342	4,078
1968-69	7,306	6,564	4,801
1969-70	7,419	5,502	5,078

SOURCE : 1. H.S.L. Statistics for Iron & Steel Industry in India 1970- P.4.

2. Other figures for steel analysed in the explanation are collected from INDIA, a reference Annual 1982.

TABLE NO. 13

PRODUCTION, EXPORTS, IMPORTS OF FINISHED STEEL IN INDIA 1946-1947 to 1969-70

In '000 Tonnes

Year/ Period	Bhlai	Durgapur	Rourkela	Others	Total	Imports	Exports
1946-47	-	-	-	905	905	38	7
1950-51	-	-	-	1,070	1,070	182	8
1955-56	-	-	-	1,308	1,308	304	5
1960-61	24	2	30	2,281	2,337	1,238	2
1965-66	735	531	780	2,558	4,604	734	140
1969-70	1,121	442	801	2,621	4,985	367	687

SOURCE : India, 1982, A Reference Annual

NOTE : Others include TISCO, IISCO, MISW.

II FIVE YEAR PLAN

The expansion of the Iron and Steel Industry had obviously the highest priority. The level of production in these materials determines the tempo of progress of the economy. Diverse types of fabricating facilities, such as the establishment of heavy foundaries, forgings and structural shops is imperative.

Prof. Mahalanobis clearly stated in the draft plan, frame"In the long run the rate of industrialisation and the growth of national economy would depend upon the increasing production of coal, electricity, iron and steel, heavy machinery, heavy chemical and the heavy industries generally which would increase the capacity for capital formation."[6] One important aim as emphasised by him "is to make India independent as quickly as possible of imports of producer goods so that the accumulation of capital would not be hampered by difficulties in securing supplies of essential producer goods from other countries. The heavy industries must, therefore, be expanded with all possible speed."[7]

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6. Government of India, New Delhi "The Second Five Year Plan, P.43.
7. Ibid, P.43

After 1956, Iron and Steel Industry developed rapidly. During this plan three new Mills as envisaged in the First Five Year Plan were erected in the Public Sector, each with the total capacity of one million ingot tonnes. The construction of these three mills was completed successfully during the second plan period. The first blast furnace of Rourkela and Bhilai was commissioned in 1959 and that of Durgapur in December, 1959.

Inspite of the timely completion of the programmes for growth and expansion of Iron and Steel Industry by the end of Second Plan Period, the production of finished steel was less than the projected target of 4.3 M.T. The output in the last year of the plan was 23,37,000 tonnes (Table 12). However, the Second Five Year Plan was regarded successful for the rapid and speedy growth of Iron and Steel Industry in this country.

THIRD FIVE YEAR PLAN

Under the Third Five Year Plan too, the Iron and Steel Industry continued to receive priority for expansion and development. Investment of Rs. 550 crores was made in the Steel Industry during the Third Plan Period. The amount was slightly over 6% of the total plan outlay. The

investment was intended to increase the finished steel capacity from 4.5 million tonnes to 7.5 million tonnes. However, the production target was set at 6.8 million tonnes for the plan which could not be achieved fully— the production was only 2.2 million tonnes. This short-fall in production was due to delay in the implementation of plan projects.

The production of finished steel declined during 1966-68 owing to recession in the country. On the other hand the export of finished steel increased rapidly on account of the considerable reduction in domestic demand for steel. In 1969-70, 687 thousands tonnes of finished steel was exported. In 1976-77 Indias exported 2,485 thousand Tonnes, slightly over 45% of its finished steel production capacity.

The figures explained in the statement are collected from "India" a reference annual Book, 1982.

FOURTH AND FIFTH YEARS PLAN

The belated launching of the IVth Plan owing to economic difficulties, led to less ambitious targets of finished steel production than those for two previous plans. By the end of 1973-74, the finished steel capacity was to go on to 9.0 million tonnes, while the finished steel output was expected to reach 8.1 million tonnes. It was envisaged that the targets could be met by an expansion of the Bokaro and Bhilai Steel Plants in Public Sector. But, due to the operational difficulties at some of existing plants and also delayed completion of Bokaro mill, the production of the integrated mill remained 5.9 M.T. in 1976-77.

The Fourth Plan Steel Programme was based on the maximum utilisation of existing steel capacity and preparation of plant to set up three new steel plants at Salam (Tamil Nadu), Vijayanagar (Karnataka) and Vishakhapatnam (Andhra Pradesh) to create additional steel capacity to meet the requirements in the fifth plan.

However, it was only at the close of the fifth plan, which terminated a year ahead of the schedule on 31st March, 1978, that there was addition to steel making capacity of

the order of 17 lakh tonnes with the Commissioning of the Bokaro Steel Plant on 26th February 1978. The total installed ingot steel capacity which stood at 89 lakh tonnes as on 31st March, 1974 had increased to 116 lakh tonnes by 31st March, 1980. The management of IISCO was taken over by Government on 14th July, 1972 and the ownership acquired on 17th July, 1976 with a view to improving its working.

PRODUCTION CAPACITY

There are at present six integrated steel plants in the country, Five in Public Sector and One in Private Sector. The table given below shows the capacity of six integrated steel plants.

RATED CAPACITY OF STEEL PLANTS

(In '000 tonnes)

Public Sector	RATED CAPACITY			
	Ingot Steel		Sale-able Steel	
Bhilai	2,500	1	1,965	1
Durgapur	1,600	4	1,239	4
Rourkela	1,800	3	1,225	5
Bokaro	2,500	1	2,000	1
IISCO	1,000	5	800	6
Private Sector				
TISCO	2,000	2	1,500	3
TOTAL :	14,000		8,729	

SOURCE : Government of India, New Delhi "The Fifth Year Plan".

The six integrated Steel plants comprising Bhilai Rourkela, Durgapur, Bokaro, IISCO and TISCO have a capacity of 9.4 million tonnes to produce ingot steel and 7.2 million tonnes to produce sale-able steel. Bhilai and Bokaro Steel Plants had undertaken programme for further expansion in this capacity of 40 lakhs of ingot tonnes each, proposals are also under consideration for technological improvement for the attainment of highest standard of efficiency in these plants. A scheme has been sanctioned by the Government for a plant at Rourkela to produce 37,500 tonnes of CRGO and 36,000 tonnes CRNO sheets per annum to fulfil the requirement of electrical industries. Besides, the mild steel plant, there is an alloy steel plant at Durgapur in the Public Sector with rated capacity of 1 lakh tonnes of ingots to be expanded to 1.16 lakh tonnes. VISL at Bhadravti, with the capacity of 72,000 tonnes of alloy and special steel and 48,000 tonnes of mild steel ingot is jointly owned by the Central Government and State Government of Karnataka. A forge plant has been set up which will increase the capacity of alloy and special steel at VISL by 5,000 tonnes.

The analysis presented in Table-14 about the actual production in the six integrated steel plants show Bhilai

with major share in total production of ingot steel followed by TISCO, Bukaro, Rourkela, Durgapur and IISCO. In 1978-79 Bhilai produced 26.9% ingot steel, TISCO 28.8%, Rourkela 16.1%, Bokaro 14.6%, Durgapur 11.5% and IISCO 7.7%. In contrast with 1978-79 TISCO emerged as the leading producer of ingot steel in 1984-85 with 24.7%. Bhilai occupied the second position 24.08% followed by Bokaro (23.20%), Rourkela (13.49%), Durgapur (9.16%) and IISCO (5.35%). The Public Sector as a whole supplied 75% of the ingot steel. Saleable steel with largely produced by Bhilai (28%), TISCO (23.9%), followed by others in 1978-79. In 1984-85, Bhilai remained at top of Saleable steel producer with 25.8% of saleable steel production. IISCO produced 24.49%. Public Sector produces 76% saleable steel in the country. The Table-14 contains figures of pig iron production in Public Sector alone since TISCO's data were not available. Bhilai is the major producer of pig iron in the country; its production in 1978-79 was 40.75% and in 1984-85 47.42%. Bokaro is the second largest producer of pig iron. Bhilai and Rourkela together have produced 80% of pig iron during the period 1978-1985.

When the rated capacity is compared with actual production in terms of ingot steel, Bhilai and Bokaro with equal capacity of 25 lakh tonnes occupy the first rank.

TISCO is the second largest steel plant in the Private Sector with the capacity of 20 lakh ingot steel. Bokaro's capacity for saleable steel is the largest in the country followed by Bhilai and TISCO. It appears that except TISCO and Bhilai other steel mills have not been able to produce steel to their full capacity.

SIXTH FIVE YEAR PLAN

The Sixth Five Year Plan made demand projection of 12.9 M.T. by 1984-85 and of 18.4 M.T. by 1989-90. Starting from a consumption level of 8 M.T. in 1979-80, the production of steel including the output of mini steel plants, was planned to be raised from 7.4 M.T. in 1979-80 to 11.5 M.T. in 1984-85 and 17.4 M.T. in 1989-90.

The Sixth Five Year Plan provided for the expansion of Salem Steel Plant, Vishkhapatnam Steel Plant and Vijayanagar Steel Project. The detailed project report of Salem Steel Plant envisaging the production of 22,000 tonnes of sheet and strips products comprising 70,000 tonnes of stainless steel, 75,000 tonnes of electric steel and 75,000 tones of other steel was approved by the Government in March, 1977. With the implementation of the first

stage of the project, 32,000 tonnes of cold rolled stainless steel sheets and strips would be produced. The Sixth Plan envisaged expansion in capacities of steel plants. The expansion programme at Bhilai Bokaro and Vizag, were taken up in the later part of the plan period.

The accompanying Table No. -15 shows the additional capacities envisaged in the sixth Five Year Plan.

TABLE - 15

Plant	Scheme	Completion Years	Start of Production
Bhilai Plant	4.0 MT expansion	1982-83	1983-84
Bokaro Steel Plant	(a) 4.0 MT exp.	1982-83	1987-88
	(b) 1.75 MT stage	1986-87	1987-88
AG Steel Plant	(a) Ph.1(1.15 MT)	1984-85	1985-86
	(b) Ph.11 (2.25 MT)	1987-88	1987-88
	16.10 M.T.		

SOURCE :- Sixth Five Year Plan, 1980-85, Government of India Planning Commission.

The Sixth Plan had provided for additional capacity of 16.10 M.T. at a total cost of Rs. 2,250 crores. Of it, Bhilai was to have expansion in its capacity by 4 M.T. Bokaro 3.75 M.T. and Vizag 3.40 M.T. There was no expension programme in TISCO during the Sixth Plan.

The policy of public Sector Steel plants is for easily attainable target. The fact can be seen for date in Table-16 . The rated capacity of Bhilai Steel plant during 1981 and 1984 was 2.5 million tonnes, against which Bhilai was to attain a target of 2.4 M.T of ingot Steel in 1981-82, 2.2 M.T. in 1982-83 and 1.8 M.Ts in 1983-84. The same holds true of the other public steel plants. The Research Scholar is unable to understand as to why the lower target was set when more of the steel was demanded for developmental activities I can only infer that low production of steel is the direct consequent of low target culminating in wider disparity between demand and supply of course, public criticism of Steel Plants would no longer be so intense on minus short fall in fulfilling the targets. It is not a desireable practice on the part of the planners to fix a target incompatibly low with rated capacity since it results in high cost of production. The Steel plant's capacity to generate more resource for economic development is also adversely affected by the deliberate policy of the planning commission in reducing the steel production.

ACHIEVEMENTS

Table-16 reveals a gap in actual production and target during 1981-82 and 1983-84. The target of the sixth plan for the production of Hot Metal by integrated Steel plants was 10970,000 tonnes in 1981-82. The actual production for the same year was 9,502,000 tonnes less by 1468,000 tonnes than the target. The actual production fell short by 13.38 %. The production target of ingot steel for the same year was 9950,000 tonnes against which the actual production was 8597,000 tonnes leaving a gap of 13.59 % between target and production. Targetted Production of saleable steel was 78,50,000 tonnes for 1981-82 but the actual production was 72,56,000 tonnes which was less by 7.56 % than its target.

In 1982-83 the target of hot metal was 11,21,000 tonnes but its actual production was 94,88,000 tonnes falling short of target by 15.36 %. The target of production for ingot steel was 90,95,000 tonnes for 1982-83. Its actual production was 86,25,000 tonnes which was less than its target by 470,000 tonnes or less by 5.16 %. Target for production of saleable steel in 1982-83 was 73,50,000 tonnes against which actual production was 72,91,000 tonnes. The actual production remained behind the target by 0.302 %.

In 1983-84, the target of hot steel was less ambitious at 93,83,000 tonnes than the one for the previous year. The actual production was 91,16,000 tonnes which was less by 267,000 tonnes than the target. The short fall was of the order of 2.84 %. The target of production of ingot steel for 1983-84 was 79,32,000 tonnes which was less than the one for the previous year. The actual production was 79,27,000 tonnes which fell short of the target by 4,3,000 tonnes or by 0.05 %. The production target of saleable steel for the year 1983-84 was 62,81,000 tonnes which was less than the one for the last year. The actual production had exceeded the target by 116,800 tonnes or 1.86 %.

It is clear from the Table that the contribution of SAIL to the production of ingot and saleable steel was in the vicinity of 80% over the period under review. The SAIL also showed good performance in terms of the target of steel production. The SAIL had produced both ingot steel and saleable steel more than the target in 1983-84.

TABLE-16

TARGETS AND ACTUAL PRODUCTION (In 000 Tonnes)

HOT METAL	1981-82 Target	1981-82 Actual	1981-82 Shortfall excess	1982-83 Target	1982-83 Actual	1982-83 Short-fall excess	1983-84 Target	1983-84 Actual	1983-84 Short fall excess
B S P	2792	2377	-415 (14.86)	2820	2330	-490 (17.33)	2200	2124.1	-75.9 (3.45)
D S P	1291	1023	-268 (20.76)	1320	1056	-264 (20)	1060	977.5	-82.5 (7.78)
R S. P	1559	1336	-223 (14.30)	1490	1203	-787 (19.26)	1120	1150.0	+30 A (2.67)
B S L	2600	2192	-408 (15.69)	2800	2194	-606 (21.64)	2275	12275.1	+.1 A (4.39)
IISCO	938	800	-138 (14.71)	940	912	-28 (2.97)	888	843.6	-44.4 (5)
SAIL	9130	2728	-1402 (15.35)	9370	7695	-1675 (17.87)	7543	73703	-172. 7 (2.28)
TISCO	1840	1774	-66 (3.56)	1840	1793	-47 (2.55)	1840	1745.7	-94.3 (5.12)
Total	10970	9502	-1468 (13.38)	11210	9488	-1722 (15.36)	9383	9116.00	-267 (2.84)

	1981-82			1982-83			1983-84		
	Target	Actual	Short fall excess	Target	Actual	Shortfall excess	Target	Actual	Short fall excess
INGOT STEEL									
B S P	2414	2215	-199 (8.24)	2202	2130	-72 (3.26)	1800	1837.3	+ 37.3 A
D S P	1124	930	-212 (18.86)	1056	952	-104 (9.84)	850	8062	46.2 (5.43) A
R S P	1646	1203	-943 (26.31)	1285	1144	-146 (10.97)	1064	1087.75	23.7 A (2.33)
B S L	2050	1793	-257 (12.53)	1956	1829	-127 (6.49)	1650	1680.75	30.8 A (1.86)
IISCO	758	600	-158 (20.84)	656	6247.32		628	542.9	-85 (1.86)
SAIL	8010	6641	-1369 (17.09)	7155	6679	-476 (6.65)	5992	5994.9	37. 1 (0.619)
TISCO	1940	1950	+16 A	1940	1946	+6 A (0.3)	1940	1973.0	+33.0 A (1.70)
TOTAL	9950	8597	-1353 (13.59)	9095	8625	-470 (5.16)	7932	7927.7	-4.3 (0.05)

	1981-82 Target	Actual	Short fall excess	1982-83 Target	Actual	Short fall excess	1983-84 Target	Actual	Shortfall excess
SAIL/ALE STEEL									
B S P	1965	1818	-147 (7.4)	1665	1638	-27 (1.447)	1460	1754.4	+114.4 A (7.84)
D S P	910	762	-128 (14.06)	868	812	-56 (6.45)	658	693.4	-55.6 (8.45)
R S P	1025	1091	+134 (13.93)	1091	992	-09 (0.09)	838	862.4	+24.4 A (2.91)
B S L	1600	1472	+272 (175)	1534	1529	-5 (0.32)	1275	1788.0	+ 13 A (1.02)
IISCO	650	438	-112 (18.00)	532	520	-12 (2.71)	500	443.8	-56.2 (11.24)
SAIL	6300	5651	-649 (10.30)	5800	5671	-129 (2.22)	4731	4771.0	+ 40 A (.084)
TISCO	1550	1605	+55 (3.54)	1550	1620	+70 A (4.51)	1550	1676.0	+ 76 A (4.90)
TOTAL	7850	7256	-594 (7.36)	7350	7291	-59 (0.802)	6281	6397.8	+ 116.8 A (1.86)

SOURCE;- Economics Trends, I September, 1984 Vol. XIII No. 17

The short fall in production has been calculated by the Scholar.

"A" demonstrates increase in production from the target.

SEVENTH FIVE YEAR PLAN

The Steel Industry has not been accorded priority in the seventh plan for additional capacity, either by expansion or establishment of new plants. The fact is borne out by the Table appended below :-

Table-17

EXISTING RATED CAPACITY PER YEAR (In Million Tonnes)

	E.C.*	R.C.	E.C.
Bhilai *	1.4	2.5	
Bokaro *	1.4	2.5	
Durgapur	1.4	1.6	
Rourkela	0.8	1.8	
Indian Iron and Steel	0.6	1.00	
Tata Iron & Steel	1.4	2.2	
Total	7	11.6	

* Bokaro and Bhilai are going on to 4 Million Tonnes their expansion units have been completed and commercial production is expected to start in a few months.

SOURCE :- 1. Mahanti, P.C. , Article = Steel Arrested Growth Commerce Bombay, Jan. 18, 1986, p. 106. Effective capacity is estimated by R. Scholar from average production during 1970-84.

Sixth Steel Plants have a rated capacity of about 12 million tonnes corresponding to which a finished Steel capacity of 8 M.T. should be available. But it usually happens that the supply of finished steel from indigenous source is much less, chiefly because the effective capacity of Indian Iron & Steel Company is really 600,000 tonnes as against its rated capacity of one million Tonnes. It holds true of the other steel plants. From the Table 17 it is apparent that in case of Durgapur Steel Plant, the effective or attainable capacity is placed at 1.4 M.T. against the rated capacity of 1.64 %. In other words, it can be said that while the rated capacity of integrated steel plants today is just little over 11 M.T., the effective capacity is 7 million Tonnes, which is inadequate to fulfil the demand for 8 M.T.

TABLE -18

(Rs. in crores)

Expansion	1984-85	1985-86
Bhilai 4 M.T.	215.41	210.00
Bokaro 4 M.T.	144.30	124.00
Modernisation		
Durgapur	5.00	16.00
Rourkela	1.00	1.00
IISCO	-	1.00

SOURCE :- Minister of Steel Rajya Sabha Ans. .75 dated July 23, 1985 Quoted in "The Economics Times" Sept. 4, 1985 .

The Bokaro and Bhilai steel plants are being expanded to 4 M.T. capacity each. The latest estimated costs of these Schemes are " Rs. 2,000 and Rs. 2,300"[1] crores respectively. SAIL has formulated Schemes for technological upgradation of the Steel plants at Durgapur, Rourkela and Burnpur (IISCO) at estimated costs of Rs. "990 crores , Rs. 690 crores"[2] and Rs. 930" crores respectively.

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1. The Economic Times, Sept.4,1984, P. 4.
2. Ibid, P. 4.

TABLE - 19

PRODUCTION OF STEEL AT SAIL AND TISCO and Mini Steel Plants.

(Sale-able Steel) ('ooo tonnes)

Year	SAIL (Including IISCO)	TISCO	Mini Steel Plant	Total
1983-84	4771	1626	1976	8373
1984-85 (Estimated)	5280 (106%)	1700 (4.5%)	1795 (-9.2%)	8775 5.9
1985-86 (Plan)	5920 (12.12%)	1700 (0%)	1900 (5.8%)	9520 (17.9%)
1983-86	24%	4.5%	(-3.8%)	24.7%

SOURCE :- Economics Trends , 16 April, 1985, p. 25.

Annual Rate :

The Table 19 shows production of Steel at SAIL and TISCO including Mini Steel plants. It is distinct from the table that TISCO has fared well in comparison with SAIL and Mini Steel Plants. The factors for TISCO's satisfactory, attributed to maximum capacity utilisation, availability of right quality of inputs and market needs. Efforts are being made in SAIL also to attain higher capacity utilization by proper maintenance and inputs of the desired quality.

Analysis of production in the foregoing Table highlights the fact that SAIL is the pace-setter in the growth of steel production in the country. The whole industry's annual growth rate during 1983-86 was 8.2 % which is set by SAIL with 8 % of growth in steel production. The TISCO and Mini Steel plants, all of which belong to private sector attained growth of 1.5 % and -1.3 %. Contrast in production trend is the outcome of modernization and expansion programmes undertaken in the public sector alone. TISCO and Mini Steel plants, though having significance share in total steel output, failed to effect any growth in it due to lack of capital investiment activities.

CAUSES OF SHORT FALL IN ACTUAL PRODUCTION

As stated earlier public steel plants have lagged behind the production targets. Chief causes of short fall can be attributed to infrastructural constraints, including scarce supply of coal, power and bottlenecks in rail transport. The power shortage undermined the production of saleable steel because molten steel could not be converted into saleable steel. It, thus, accounts for the accumulation of ingot steel.

In order to overcome the set back in production, the following suggestions are worth considering :-

1. To eliminate the infrastructural constraints, coking coal need be imported to balance the high ash-content of indigenous coal. It is advisable to import approximately 1 to 12 M.T. Of Coal per year for some time. It is also corroborated by observations of Planning Commission to redue ash-contents of coal.

2. Capative Power Plants should be introduced to cater to essential operating needs of steel plants chiefly at Bokaro Purgapur and Rourkela. Planning Commission is also of the opinion that Steel Plants should have their own power generating system.

3. R & D activities must be given top priority for achieveing fuel efficiency in blast furnaces as well as improving steel making techniques.

4. Speedy implementation of modernisation and replacement programme is needed to increase production capacity and productivity.

5. Expansion schemes have to be expedited to avoid high cost of project due to unnecessary delay in implementation.

6. To undertake implementation of Vizag Steel project to make it operational under Seventh Five Year Plan.

7. Completion of on-going projects in Bhilai, Bokaro, and Alloy Steel Plants, Durgapur.

8. Initiation of D.R. (Direct Reduction of Iron Ore) plants preferably near the mini steel plants baded on coal, natural gas/or gasified coal to augment supplies to mini steel plants.

9. Expansion of Cold rolling facilities for stainless steel at the Salem Steel Plant.

10. To import H.R. coils, electrical steel, structurals, wheels, and axles and export of railway materials, plates and large dia ERW/SW pipes.

11. Modernisation, debottlenecking/revamping of SAIL plants and the phase II of TISCO modernisation. The major portion of this job can be carried out during the plan period.

Iron and Steel Industiry has made substantial contribution in the economic development of the country. The successive Five Year Plans aim at banishing poverty attaining higher rate of growth, reduction in disparity of income and wealth and self reliance. Iron & Steel

Industry being the core and mother industry, is in the position of laying down the ground for the development of heavy industries as it provides the basic material for their growth. The second Five Year Plan assigned top priority to Iron and Steel industry. The other aim of Plan for the expanding Iron and Steel Industry was to achieve indepenedence from imports.

India expanded Iron & Steel Industry in the public Sector. Thus, we have become the first country outside the socialist world to have our won plans for establishment of basic industries including Iron and Steel Industry. The model ofplanning was directed towards transition from agriculture to an industrial economy.

Expansion of Iron and Steel Industry has paid rich dividend to the nation. It is a matter of pride that india is today one ofthe twelve industrial nations in the world capable of sustaining a higher level of Industrial production. The spread of technology by the the process of ancilarisation can sustain a high level of employment. The Industrial infrastrucure has come up because we have steel industry which will provide further mementum to further industrialzation if it is

allowed to expand in future. The production of Steel in the country has reached the level of self-sufficiency. The savings over the period of existence of new steel plants have by now exceeded the foreign exchange cost of steel projects.

The strategic significance of steel Industry is high-lighted by the forward linkage of Steel to the defence of the country. As a matter of fact, the Iron and Steel Industry has encouraged integrated growth and development of various components of our economy; agriculture and Industry, transport and communication etc.

C O N C L U S I O N

Public sector in India has been assigned a pivotal role to play in industrial growth and development. With the advent of British rule, the Indian economy had suffered great set-back as it was confined to only primitive agricultural economy, supplying raw materials to the British Industries in exchange for manufactures from England.

The concept of "public ownership" and "socialism" emerged out of wide economic disparities between "haves" and "have nots". These concepts were contemplated as a means of emancipation of working classes from capitalistiseexploitation and also as a means of bringing about balanced economic growth. Many Industrial policies were formulated to attain the objective of planned development. The Industrial Policies of 1948 and 1956 came as a main stay for industrial revolution in this country. It was resolved that the Government and private sector would work together for speedy and steady industrial growth.

In the beginning, public sector was designed to serve the social cause through public utility services. Later on certain industrius of strategic importance were included in public sector to perform commercial

activities with the objective of balanced economic development in terms of social gains and generation of surplus for further financing economic development.

Public Sector enterprises have been making phenomenal contribution to national income in terms of investment and output. Its number has risen from 5 in 1951 to 214 in 1984 and the investment from Rs. 29 crores to Rs. 35,411 crores. During the period of study 1960-61 to 1983-84.

Public Sector Enterprises (PES) have been largely financed by the Government. Share of foreign capital in Public Sector Enterprises is quite limited. Public Sector Enterprises (PSE) have also registered a phenomenal increase in internal resources. During the period 1981-82 to 1983-84, the PES generated internal resources to the tune of Rs. 922.87 crores and 2830.80 crores, respectively. The share of Public Enterprises Sectors in demostic products and savings has increased from Rs, 366.17 crores in 1970-71 to Rs. 14,532 crores in 1983-84 a net increase of 25 %. As regards employment, it is remarkable to note that Public Sector Enterprises have generated more employment that the whole economy - the growth rate being 3.7 % during the period of 15 years as compared with the rate of 2.4% for the entire economy.

Public Sector Enterprises (PSE) has significantly contributed to the national exchequer in two ways i.e. dividend and taxes. The total contribution to central exchequer by Public Sector Enterprises (PES) was Rs. 1,196 crores in 1975-76 which increased to Rs. 6,566 crores in 1983-84. This tremendous increase itself speakes of its brillient achievement in developmental programme.

Public enterprises are meeting the requisite social and economic objectives by providing ample scope for increasedproduction, sizable return on investment massive employment generation and balanced economic growth and development.

There were only two successful steel plants in the pre-independence period vis. TISCO (estab. in 1906) and IISCO (estb. in 1913). After independence it was fully realised that India must have larger facilities for making steel for speedy industrial development. The second plan came as a giant leap forward in steel production in public sector. During this plan, three new plants were envisaged. The first blast furnace went on stream at Rourkela, Bhilai and Durgapur in 1959. The third plan set a target of 6.8 M. Ts with an investment of Rs. 550 crores. The fourth plan envisaged the capacity of 9 M.Ts. The fifth plan,

made an addition of 17 lakh tonnes to the capacity of Bokaro steel plant. The sixth plan provided for the expansion of Salem Steel plant, Vishakhapatnam, and Vijyanagar steel plants. Recently SAIL has made schemes for technological upgradation of steel plants at Durgapur, Rourkela and Burnpur (IISCO) at an estimated cost of Rs. 1,989 crores. The country now possesses capacity to produce over 11 M.Ts. of steel.

Expansion of steel Industry underscrores the integrated growth of the economy. The steel industry is linked to the defence of the country, development of agriculture, transport communication and manufacturing sector as a whole.

CHAPTER - II

CONCEPTUAL FRAME-WORK OF PRODUCTIVITY : A SURVEY OF LITERATURE

The foregoing Chapter-I has analysed the development of Public Sector Enteprises in India to highlight their role in the development of socialistic democratic society and to provide infrastructure for further industrial growth of the economy. To attain this objective, huge investments have been made in the Publis Sector. Though resources have been mobilised in different froms to finance the Public Sector projects, the future development of Public Sector Enterprises is subject to the surpluses to be generated by them from efficient operation.

The present chapter is devoted to the survey of literature so that a frame-work for the study of productivity of Public Sector Enterprises is prepared with a view to examine the extent to which the factor inputs are deployed efficiently in Public Enterprises.

A SURVEY OF DEFINITION

Productivity is a lever for economic development. Higher productivity means higher standard of living to the people and status to the nation. The desire for rapid economic

development calls for proper understanding of productivity both in the context of national economy and unit level economy.

Productivity has been defined in different ways. Some of them are elaborated below :-

1. Productivity is defined as the ratio between output and input.
2. Productivity is also taken to mean efficiency in all activities.
3. Productivity also involves elimination of wagtage in all its forms.
4. Productivity is the function of providing more and more of everything for more and more people with less consumption of way of resources.

Productivity reflects attitude of mind towards progress. It involves improvement of that which exists. There has to be constant and continuous adjustment of economic and social life to changing condition. Productivity is the process of continuous effects to apply new technique and new methods. Productivity is, therefore, human effort to attain qualitative and quantitative improvement in products without extra expenditure of resources. The cost is the same in terms of land material machine time and labour.

Essentially importance of productivity is based on human concern for the following :-

1. Higher production.
2. Better quality.
3. Less consumption of resources.
4. Benefit for both Industry and Community.
5. Attitude towards constant improvement and progress.

The factors determining productivity fall into the following seven categories :-

1. Technical Factors.
2. Management Factors.
3. Financial Factors.
4. Labour Factors.
5. Government Factors.
6. Environmental Factors.
7. Natural Factors.

Technical Factors are concerned with the ingenuity of engineers in devising tools, productive methods and systems and other materials.

The management factors consist of attitudes and behaviours of management in respect of competitive spirit, willingness to assume to risk, efficient scheduling of work,

aggressive expansion of market, efficient handling of labour relation, involvement research for new and better method and standardization of products.

Financial factors and productivity are interdependent. The capital will have to be available for financing innovations in existing industries and development of new ones.

The labour force must possess a degree of skill, general education and training, health and moral. There must be regulated hours of work and wages, adoptability and willingness to accept innovations and they must assume right attitudes towards works and responsibility.

Nothing can be achieved if Government policies are conduc-ive to dealings with labour, trade and commerce. The taxation policy must have an incentive for attainment of higher productivity. There must be a policy for industrial and agricultural expansion and tariff and financial assistance to the industry.

Labour productivity cannot be defined from personal factors, envision mental factors and social factors. Education, training motivation and health make up the personal factors of an individual which account for difference in productivity of labour. Works methods and materials types

of tools and equipment are also responsible for productivity of the labour. The productivity of labour will also be effected by physical factors such as lighting, ventilation, noise, temperature etc. Nature of leadership social climate in shop, attitude towards production and group formation among the workers and social and psychological factors which bears on the productivity of labour.

Organisation factors also determine the labour productivity. The labour productivity will be affected if there is not an efficient communication pattern, organisational control, a system of decision making, reward add punishment.

Natural factors are also responsible for productivity of labour. They consist of weather presence or otherwise of minerals and other resources and also condition of soil.

There is no denying the fact that productivity has to be measured for the sake of monitoring the progress of any industry of any enterprise, productivity affects cost, profit, output, employment and investment.

There is controversy even today as to a suitable concept of productivity. The conservative school is in favour of internal rate of return as a measurement of productivity

which is challenged by the proponents of public sector as a narrow concept. They advocate for the value of output and services rendered by public investment as the appropriate guide.

The concept of productivity signifies increases in output which are not accountable by increase in the quantity of inputs. The productivity concept is, therefore, based on the assumption of relationship between inputs and outputs.

"Increase in production must be accompanied by a reduction in the cost of production of every additional unit. This means securing higher productivity[1].

Even Clangne says -" Productivity is an overall efficiency with which our industries perform.[2]

Russel W.Fensake[3] defines the terms productivity in five ways. They are :-

1. Productivity is a form of efficiency;
2. Productivity is the utilisation of resources or effectiveness of utilisation of resources;

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1. G.R. Dalvi, "Productivity and Economic Growth" NPC Productivity Journal, New Delhi, July, September'1971. Vol. XII, No.2 P.173.
2. Ewan Changne, "Productivity Employment and living standard" Conference on Productivity 4th June, 1969. University off Wisconsin, U.S.A.
3. Russel. W.Fensake, Productivity Journal, Winter 1968 Vol. IX No.3 P.224.

3. Productivity is a ratio (rather than a phenomenon);
4. Productivity is a measure of some kind (rather than a variable requiring) measurement;
5. It is a rate of return (Primarily in monetary terms) D.J.M.S. Risk defines productivity as a physical ration, it relates to the quality of goods produced or services given in comparison with the quantity of resources consumed.[4]

PRODUCTIVITY ANALYSIS OF PUBLIC SECTOR ENTERPRISES-FRAMEWORK OF THE STUDY

In the present chapter an attempt is made to formulate conceptual frame work of productivity in Public Enterprises. The subject has assumed growing importance with expansion of Public Sector at a phenomenal rate. The importance of the Public Sector is evident from its rising share in net domestic product, net capital formation and total employment in the organised sector of the economy. It is natural to undertake enquiry into the efficiency and productivity of factors production employed in the Public Enterprises. Several studies have evaluated the efficiency in terms of financial performance of Public Enterprises. The findings of those studies reveal unsatisfactory performance in terms of

4. J.M.S.Risk, Measurement in a competitive Planned Economy. Management Accountancy, July, 1970, P. 259.

profitability. This had led to several severe criticism of Public Enterprises and the basic policies of promoting the Public Sector in general. Actually the whole question of the proper criteria for assessment of these enterprises has to be examined from objective and academic points of view.

The appropriatenss of the criteria for examining the performance of Public Enterprises, stems from the approach for assessing the performance itself. In my opinion, profitability is not a suitable criterion for assessing the performance of Public Enterprises (PES), which are primarily wedded to the philosophy of socialistic pattern of society. The profitability is the criterion which may be considered appropriate for commercial purposes. It fails to give an insight into the social contribution by these enterprises to the net domestic product, net capital formation and total employment in the organisedsector of the economy. The total benefit to the economy as a whole from an introduction process comprises the sum of factor income by the sum of rent, wages, salary, interest and profit. The profitability criterion totally disregards rent, wages and salaries and also interest because these items represent costs rather than benefit. The total gains received by the economy from a production activity must include all types of income flows.

It is inevitable to evalute the performance of an enterprise by drawing a line of demarcation between direct contribution and indirect contribution to the National Economy. The direct contributions are the sum of goods and services rendered by an etnerprise in the economy. The indirect contribution is the impact of production activity of an enterprise through its backward and forward linkage on general level of economic activity in the country. The capital investment in Public Enterprises mainly provide basic infrastructure whose benefits are received by economy as a whole in the form of higher level of economic activity. Profitability, therefore, is not a suitable criterion of assessment of the efficiency of Public Enterprises.

3 The relative efficiency of Public Sector Enterprises can be evaluated at a given point of time and over a period of time. The profitability is the consideration of performance at a given point of time and its relative trends are assessed over a period of time productivity on the other hand, represents the efficient use of scarce resources at a given point of time and productivity trends indicate change over a period of time.

The productivity can be measured either for specific factor of production or with respect to all factors of productions. The formal method consists of labour productiviry measured as net output per person employed and capital productivity measured as net output of capital employed.

To measure the labour productivity of Public Sector Enterprises, I have estimated total employment in Public Sector vide table - 3.1 and 3.2. These estimated help me to find out the growth rates and trends in employment of Public Sector Enterprises.t To find out the weightage of labour input in the production activity of Public Enterprises I have also estimated trends in average earnings of labout originating in Public Sector Enterprises. The trend in labour productivity, as discussed earlier is assessed as net output per man employed in Public Sector Enterprises vide Table-5.

Measurement of capital and its growth during the given period is the first task in productivity trends. Capital is a major factor input which consists of a multiplicity of physical objects already produced by the economy and, in turn, used for the current production of other commodities. Viewed from this angle, the problem of measurement of real capital resolves itself into the identification, valuation at some base year prices, and aggregation of the values so obtained of a large number of physical objects which enter as inputs in the current output of final goods and services in the economy.

The measurement and camparison of the stock of real capital existing at two distinct points of time become difficult because (a) the capital goods, which constitute the aggregate capital stock, generally show a great deal of heterogencity, and (b) the form that different types of capital goods take keeps on changing with the passage of time largely on account of the continuous process of technological change. The question that arises, therefore, is: how are the capital goods built at different times, at different costs, and with different performance characteristics, to be equated in the construction of a time series showing the aggregate value of capital stock measured at some constant prices? The Economists have provided the following answer to this intricate question: The value, in base period prices, of the stock of durable capital goods (before allowance for capital consumption) measures the amount it would have cost in the base period to produce the actual stock of capital goods existing in the given year (not its equivalent in ability to contribute to production). Similarly, gross additions to the capital stock and capital consumption are valued in terms of base year costs for the particular types of capital goods added or consumed. This must be modified immediately in the case of durable capital

goods not actually produced in the base year, to substitute the amount it would have cost to produce them if they had been known and actually produced. But a similar modification is required in all index number problems.

The concept of Capital implicit in the above mentioned measure of real capital stock is most appropriate in the analysis of productivity. According to professor Joan Robinson, it corresponds to the essential nature of capital as a factor of production.

The method which is generally followed in preparing the time series of real capital stock is known as the Perpetual Inventory Method. This method was pioneered by Dr. Goldsmith while preparing the time series of national wealths in the United States.[1] The method, as it was originally devised by Goldsmith, consists in taking a fairly long time series of gross capital formation, correcting it for price changes, and then aumulating the figures so obtained year by year after making suitable deductions for capital consumption.

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1. Goldsmith, R: "A Perpetual Inventory of National Wealth", Studies in Income and Wealth, Vol. 14 (New York : National Bureau of Economic Research, 1951).

In practice, however, a slightly modified variant of this method is often used especially in the case where a sufficiently long time series of capital formation is not available. The modified variant of this method requires: (i) an independently derived estimate of the net capital stock relating to a given bench mark year in the period under consideration; (valued at constant base period prices; (ii) the estimates of gross capital formation at constant base period prices for each year in the period under consideration; and (iii) the estimates of the actual capital consumption of the effective depreciation of capital consumption or the effective depreciation of capital stock for each year in the specified period. Given these estimates; the required time series of real capital stock can be obtained carrying the given bench mark estimate of net capital stock forward (or backward) with the help of the estimated real net capital formation.

In what follows, this variant of the perpetual inventory method is followed to derive the estimates of real capital stock in public enterprises for the period 1960-61 to 1985-86.

(i) Bench-Mark estimates of Net Capital Stock :

The value of net capital stock at any given point of time is, as already discussed above, obtained by measuring the aggregate amount it would have cost in the specified base

period to produce the actual stock of various types of capital goods existing at a given point oftime. However, the figures relating to the value of fixed capital assets which are generally reported in the Annual Reports of Public Enterprises, and even in the sources like the Annual Survey of Industries, do not even approximately correspond to the above concept of capital and hence fail to provide the required measure of capital input.

The main difficulty with the reported figures is that they invariably indicate what is called 'depreciated book value of capital assets', which is nothing but the accumulated annual aggregate expenditure on all types of capital assets, expressed in the respective current money terms, adjusted for the corresponding annual depreciation charges. It is evident, therefore, that the reported figures of the aggregate value of capital assets represent a total misleading and distorted measure of the required economic aggregate, viz; real value of net capital stock, mainly because they represent a simple aggregation of the actual money values of annual additions to capital stock over a period oftime without making any adjustment for annual price changes during the period. This procedure yields a measure in which each annual addition to the stock of capital goods gets evaluated at different prices (i.e. at the price

prevailing in the corresponding year) with the result that their simple aggregation by itself does not yield any meaningful aggregate that can be directly used for economic analysis.

To estimate the required value of net capital stock for any specified bench-mark year, what needs to be done, therefore, is to deflate the estimate annual additions to each of the various types of capital assets, for each of the years proceeding the given bench-mark year, with the help of suitable price deflators for various types of assets. The preparation of this type of estimates of net capital stock in Public Enterprises in India has so far remained a rather neglected field of study. It has, however, not altogether been an unexplored field,

since a study published by the Reserve Bank of India in 1972 has made an attempt to estimate the aggregate value of net capital stock in the Public Sector as a whole for the bench-mark year 1960-61 at current prices. But the RBI estimates have not provided any information on the departmental or sectoral break-up of the estimated aggregate value of capital stock in the Public Sector, perhaps because the estimate relating to the Public Sector was derived essentially as a part of the Wider Study relating to the estimation of

total value of tangible wealth in Indian Economy. Moreover, in the light of additional information which is now available, the aggregate estimated by the RBI itself requires some revision. In view of this, an attempt is made to prepare the required estimate of new capital stock in Public Enterprises by Sectoral categories for the bench-mark year 1960-61 valued at current prices (i.e. 1960-61)prices).

For the purpose of estimation, the aggregate stock in Public Enterprises is regarded as a total of the capital stock employed in non-departmental enterprises in twelver industrial categories, for which estimates of net product are already available. To estimate the net capital stock in Public Enterprises in the manufacturing and tertiary Sectors, I have used the data available from the Annual Reports on the working of Central Government Undertakings and the reports published by the Bureau of Public Enterprises. From the figures relating to the value of capital stock employed in Central Government Undertakings in the manufacturing sector excluding The Steel Authority of India Limited (formerly, the Hindustan Steel Limited) for the year 1960-61, and the previous years, I have estimated the time profile of the annual additions to capital stock. Then adjustments are made in the same for price changes, and by aggregating the figures so obtained I have arrived at corresponding estimates

of net capital stock in 1960-61 values at prices prevailing in 1960-61. This estimate of capital output ratio in public enterprises (excluding public steel mills) yields an average capital ouputt ratio of 5.88. Since the total value added in Public Enterprises in the manufacturing Sector (excluding the steel plants) works out at Rs. 73 crore for the year 1960-61, I arrive at an estimate of Rs. 429 crore as the corresponding value of net capital stock.

I have estimated the value of net capital stock in the public steel enterprises separately for the bench-mark year 1960-61 by using the same method that I have followed in the case of other Public Enterprises. The man reason in separating the Public Steel Plants from other Central Government manufacturing concerns for the purpose of estimating capital stock is that the former is far more capital intensive and shows a considerably different time profile of annual additions to capital stock as compared to the latter. The estimated capital stock in the Steel Authority of India (formerly, the Hindustan Steel Limited) works out at Rs. 643 crore in 1960-61 valued at the prices prevailing in 1960-61. This gives us an estimate of Rs.1,063 crore as the value of net capital stock in Public Enterprises in the manufacturing sector for the bench mark year 1960-61.

(ii) Estimates of Real Not Capital Formation :

The official estimates of gross capital formation in Public Enterprises by type of assets and departmental categories along with the corresponding estimates of depreciation allowances are available from the National Accounts Statistics issued by the C.S.O.

Since the estimates of net capital formation valued at constant base year prices is required, it is necessary to deflate these estimates with the help of suitable price indices for different types of assets. I have derived price indices for (a) Buildings and Construction, (b) Machinery and Equipment and (c) depreciation allowance from the official estimates of gross capital formation for the economy as a whole at current and constant 1960-61 prices. The price index for the remaining component of net capital formation, viz; change in inventories; is obtained by computing the implicit price index for net product originating in various types of enterprises separately.

To obtain the broad sectoral break-up of the estimated real net capital formation in Public Enterprises, I have used the estimates of net capital formation in Public Sector

Enterprises by industry of use at current prices prepared by C.S.O. The (estimates at current prices relating to the six industrial categories which constitute the commodity producing sector, viz; agriculture, forestry, mining and quarraying, manufacturing construction, and electricity, gas and water supply. The corresponding price indices for net capital formation in these sectors are derived from the official estimates of net capital formation by industry of use for the economy as a whole at current as well as constant 1960-61 prices available for the period 1960-61 to 1985-86.

By deflating the estimates of net capital formation in Public Enterprises in the commodity producing sectors at current prices with the help of the above mentioned price indices, I have obtained the corresponding estimates at constant 1960-61 prices. Having derived the estimates of aggregate net capital formation in Public Enterprises at 1960-61 prices and the corresponding estimates of the net capital formation in the commodity producing sector I have obtained the estimates of net capital formation in Public Sector Enterprises in the tertiary sector as the difference between the former and the latter. The capital productivity is measured by me in Table-6.3 as net output per unit of

capital employed in Public Sector Enterprises. Separate estimates of capital intensity is given in Table - 6.2 to shows that the Public Enterprises are capital intensive.

The broad frame/work which the present study has adopted for analysing the productivity may be expressed in the form of the following equation :-

$$P = f\ (G_K,\ G_L,\ G_A)$$

where, P, G_K, G_L, G_A denote the productivity annual growth of capital input, Labour input and the overall efficiency of factor inputs respectively over a given period of time.

To neutralise the bias which may be the result of any assumption, I have divided the total period of 26 years under review into sub-periods (each of about eight years). The averages of each factor productivity is combined to derive the average for the whole period. The aim of this procedure is to eliminate the effect of short-run fluctuations in the estimates of productivity trends for thewhole period. This method is used widely in empirical study dealing with quantitative aspect of productivity of economic sector. It yields results which bear reasonal approximation to the reality. The whole approach is based on the hypothesis that relative contribution by various sectors is basis of total productivity in Public Sector Enterprises in India.

The total factor productivity is appropriate for evaluating the overall performance of Public Sector Enterprises. This contention follows the fact that the index of total factor productivity (measured as output per unit of total input) is the most comprehensive indicator of the trends in the overall efficiency of scaree resources utilized by Public Sector Enterprises over the longer period under consideration. The index of total factor productivity is also termed as index of output per unit of total factor input. It is derived as a ratio of the index of net output to the index of total factor input. The index of net output is the indicator of the actual growth of net output, while the index of total input indicates the efficiency of all factors of production during the period under consideration. If the growth of total factor input during the period under review is less than the corresponding index of net output, it would imply higher productivity of factor input. Therefore, the index of total factor productivity is useful device to measure the extent of decrease and increase in overall efficiency of factor input in any production process. It is worth noting that profitability criterian is different from the productivity criterian of assessing the overall performance of economic uints. The profitability criterian is static in its approach because it shows the

excess of the price charged by an enterprise to the consumer over the average cost of production contrary to this, the productivity approach is basically dynamic; it indicates the excess of actual growth of output over the growth of total factor input. It is an index of changing efficiency with which scales productive resources are used in the course of its expansion over a period of time.

PRODUCTIVITY ANALYSIS OF STEEL INDUSTRY FRAMEWORK OF THE STUDY :

Steel industry is taken by me for indepth study of productivity. Though the industry was in existence even before independence, the productivity trend has beam estimatedfor a period of 26 years from 1960-61 to 1985-86 in tune with the pattern adopted for productivity analysis of Public Enterprises as a whole. The exclusive study of this industry is due to vast investment of capital, total output which is the basic ingredient of economic development.

The analysis of the productivity trend in the steel industry has been divided into two sections the first section deals with the steel group of Public Enterprises and the second section is concerned with the industry as a whole comprising with both the Public and Private Sectors steel mills.

The measurement of the productivity in Public Steel Plants is premised on the assumption that the growth of steel products is the function of capital, labour and their overall efficiency. I have estimated the growth of steel output, the growth of labour and the growth of capital outputfor partial and total productivity analysis.

The productivity trend of steel industry as a whole has been made mere meaningful, and objective for academic purposes by sub-classifying the productivity measures in terms of income, value added and physical output ratios to capital and labour separately.

The productivity has been measured in terms of the following :-

1. Income per unit of capital.
2. Value-added per unit of capital.
3. Capital requirement per tonne of ingot steel.

The capital intensity in steel industry has been estimated in Table-11. The capital intensity has been measured as a ratio of capital to workers. The capital intensity indicates the growth of capital with the expansion of steel plants employing more of the workers. Increase in capital intensity in steel industry does not imply

substitution of labour for capital. It is mainly due to establishment of new steel mills in Public Sector and large scale modernisation and expansion.

In Table - 12 the capital Productivity has been measured as average output per-unit of capital though marginal productivity of capital is usually eliminated for investment planning. For the present purpose, marginal productivity of capital is of little use. The average capital output ratio indicates the total stock of capital in steel industry in relation to the total output. The output measured in Table-12 does not imply return to the capital. It only shows addition to output with given stock of the capital Average ratios of capital to total output of steel are rough approximation to marginal rations. For income per unit capital, I feel it unnecessary to compare the average ratio with the rate of interest because these ratios are not the return on capital in the sense of profitability.

The labour productivity has been estimated in Table-13. The weightage of the workers in income generated by Steel production process has been estimated both in terms of gross income per worker and net income per worker, on the basis or relative share of workers in total income. The contribution of the workers to total output indicates the labour

productivity. It is average output per worker. The labour productivity has been expressed both in financial and physical terms. The disparity between net income per worker and net value-added per worker is the measure of the impact of the pricing policy of the Government on the effiency of labour in steel industry. The contradictions between the rate of growth per-worker and physical output per-worker indicates the utilisation of existing capacities at different points of time. The different products of steel also called for comparison between the growth rates of value-added and physical output, because mean hours are determined by the product composition. To find out as to whether the wage bill is linked to labour productivity, a separate table has been drawn up.

Apart from the major inputs of capital and labour materials also significantly contribute to overall efficiency of steel plants. Therefore, estimates of the work cost are presented separately. The analysis is helpful to measure the impact of materials on the total cost of production. It also facilitates the measurement of material efficiency in the process of production. The increase or decrease in the average rate of work cost would indicate the extent to which the productivity of steel plants has been affected. A comparison between the selling cost of steel and work cost would open a vistas of analysis of operations of steel

industry. If the X-work price received by the Industry is less than the average price of the steel products, the Industry would be adversely affected in terms of income, value-added, gross margin etc.

The estimated work cost per tonne of steel does not highlight the changes in steel output mix because it would have been difficult for Research Scholar to give precise measurement of the impact of each of the product-mix. I am fully aware of my limitations in estimating the total works cost of steel ingot produced by the Steel Industry, though the error has been minimised by studying a long period. I have studied major components of works-cost of finished product, consisting of faw material and semi-finished procuct, besides fuel and electricity. The material efficiency in the use of production has been estimated to show the consumption of pig iron in the production of steel. The consumption of coal and electricity per-tonne of ingot steel has also been estimated to measure the efficiency of major material inputs.

The estimates of value-added signify the rate of growth of output (value). The growth of value-added is subject to output prices and the material cost. Therefore, estimates of gross value-added and gross income are made for

period under review. These estimates are indicators of distributable surplus of steel Industry.

The total productivity trend has been evaluated separately in the form of total net-output index and total factor input index. It furnishes an insight into the changes taking place in the use of scarce resources by the steel industry during the period of its expansion and modernisation. The main conclusions are drawn from the findings of the analytical study of the productivity of steel Industry.

C O N C L U S I O N

The importance of productivity is essentially based on human concern for the attainment of higher production, better quality, less consumption of resources, benefit to the industries in particular and to the community in general. It is a manifestation of an attitude towards constant improvement. The factors determining productivity are technical, management, financial, labour, Government, environmental and natural factors. There is no gainsaying the fact that productivity has to be measured for the sake of monitoring the progress of an industry or an enterprise. Productivity in general, affects cost, profit output employment and investment.

There is controversy even today over a suitable concept of productivity. The conservative school advocates internal rate of return as a measure of productivity which is challenged by the proponents of Public Sector as a narrow concept. They favour the value of output and services rendered by public investment as the appropriate guide.

As a matter of fact, the concept of productivity signifies increase in output which are not accountable by increase in the quantity of inputs. Therefore, it is based on the assumption of relationship between inputs and output.

Present chapter is devoted to formulate a conceptual frame work of productivity in Public Enterprises. The subject has assumed growing significance with expansion of Public Sector Enterprises at a phenomenal rate which is evident from its rising share in net domestic product, net capitals formation and total employment in the organised sector of the economy. Thus the probe into the efficiency and productivity of factors of production employed in the Public Sector Enter prises becomes inevitable.

Several studies have evaluated the efficiency in terms of financial performance of Public Sector Enterprises which have been open to several severe criticism as it goes against the basic policies of promoting the Public Sector in general.

The proper criterion for assessment of these enterprises has to be examined from objective and academic points of view. The Research Scholar feels that it is proper to evaluate the performance of Public Sector Enterprises by drawing a line of demarcation between direct contribution and indirect contribution. The direct contribution includes the sum of goods and services rendered by an enterprise in the economy, while indirect contribution implies the impact of production activity of an enterprise through its backward and forward linkages in general level of economic activity in the country. The capital investments in Public Sector Enterprises mainly provide basic infrastructures whose benefits are received by economy as a whole in the form of higher level of economic activity. Hence, financial return (profitability) is not a suitable criterian for assessment of the productivity of Public Sector Enterprises.

The following method has been adopted by the Research Scholar to analyse productivity trends in the Public Sector :

$$P = f \ (G_K, G_L, G_A)$$

Where P, G_K, G_L, G_A denote the productivity, annual growth of capital input, labour input and overall efficiency of factors inputs respectively over a given period of time.

Research Scholar has prepared index of total factor productivity to measure productivity after ascertaining changes in factor inputs.

Steel Industry has been taken up by the Research Scholar as a case study. A period of 26 years i.e. (1960-61 to 1985-86) has been covered to analyse productivity trends in conformity with the concept adopted for Public Enterprises. The Steel Industry as a whole, comprising Public and Private mills both has also been analysed by sub-classifying the concept of productivity measures in terms of income, value-added and physical output ratios to capital and labour, separately.

CHAPTER - III

EFFICIENCY PROFILE OF PUBLIC ENTERPRISES

In the prece ding chapter entitled "Conceptual Frame Work of Productivity", the Research Scholar has made an endeavour to evolve an appropriate methodology for the measurement of productivity in Public Enteprises. The total factor productivity approach has been found suitable for empirical investigation. The total factor productivity includes capital input, labour input and overall efficiency of the factor inputs over a given period of time.

However, in the present chapter, the Research Scholar has analysed operational efficiency of the Public Enterprises in conventional terms. The study would be useful to identify factors at work against attainment of higher productivity which is presented in subsequent chapters.

Public Sector Enterprises are the catalyst of India's industrial growth and development. They are expected to harmonise and implement vigorously the national plan directing and promoting the economic well-being of the community. The performance of Public Enterprises is appraised along a multitude of different parameters; profitability, growth of

sales-volume to capital employed, investment in technology and capacity utilisation, etc. The present chapter examines financial and physical performance of Public Enterprises.

FINANCIAL PERFORMANCE

In the Table-1 for "profitability profile" date have been presented to depict profitability of Public Enterprises during 1974-75 and 1985-86. In 1974, the public sector comprised 120 units with capital employed of Rs. 6,654 crores. The number of enterprises increased every year so much so that there were 201 enterprises in 1985-86. The capital employed went up to Rs. 29,896 crores. The profit before depreciation, interest and taxes maintained increasing trend. It increased from a profit of Rs. 863.97 crores in 1974-75 to Rs. 5,774.57 crores in 1985-86. Variance in gross margin comes to Rs. 4,910.60 crores, whereas, variance in capital employed comes to Rs. 23,242 crores. The additional profit and additional capital employed shows a variance ratio of 4.73 at the level of (1%). To maintain the ratio of additional profit, public enterprises have been providing for depreciation reserves which grew from Rs. 305 crores to 2,205,36 crores. The impact of growing needs for reserve has depressed the gross profit after

the rate of variance in gross profit after depreciation comes to 5.4 as against 5.7. Lower rates of variance in gross profit after depreciation is accounted by depredíation reserves at a greater rate than the rate of growth in profit. This aspect of the performance of public enterprises has been examined by the Reacher Scholar in subsequent paragraphs.

The other provisions which the public enterprises make is related to interest. There is steadily mounting pressure of'interest' on public enterprises. The interest obligation of Rs. 247 crores in 1974-75 increased to substantial amount of Rs. 2,085 crores. The interest burden registered a varience rate of 7.4 at 1 % level. As a result of it, the profit after interest was low at Rs. 312 crores in 1974-75 and Rs. 1,485 crores in 1985-86. It yielded the variance rate of 7.5. The cumulative effect of interest and depreciation is indicated by relative figures for pre cent gross profit to capital employed before depreciation and gross profit to capital employed after depreciation and interest. The substantial difference in the two rates is accounted by large interest obligations and high rate of obsolescence.

Performance of Public Enterprises has been subjected to the test of 'sales growth' in relation to the capital employed. If the proportion of sales to capital employed rises from

year to year, it would be assumed that profit is earned by Public Enterprises through larger sales. The facts have been analysed in Table No.2. Lowest sales by manufacturing enterprises was Rs. 5,925 crores in 1974-75 and highest sales of Rs. 3,4707 crores in 1985-86, registering a variance rate of 4.9. The capital employed in manufacturing enterprises was lowest at Rs. 4,718 crores in 1974-75 and highest at Rs. 19,935 crores in 1985-86; the variance rate being 3.2. The comparative variance rates confirm the view that growth of sales was larger than the growth rate of capital employed. In terms of sales as a proportion to the capital employed, the years 1974-75, 1982-83 and 1985-86 are exceptional to the steady upword movement in the growth rate. In 1975-76, growth of sales was less than that of capital employed and in 1983-84 and 1985-86 it has taken to down-ward slope. Leaving aside the minor erratic movement, manufacturing enterprises have been successful in increasing their sales.

For the service sector, the sales was lowest at Rs. 4,260 crores in 1974-75 and highest at Rs. 12,587 crores; a variance rate of 1.09. Service public enterprises have actually registered a lower variancerate than what the manufacturing enterprises did. Capital employed also tended to grow over the period under review- from Rs.1,936

TABLE - 1

PROFITABILITY PROFILE

(Rs.in Crores)

Sl. No.		1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	No.of Enterprises	120	NA	125	149	155	159	169	NA	168	188	193	201
2.	Capital Employed	6654	Na	9006	11057	12065	13969	16182	NA	18207	21935	26526	29896
3.	Gross Margin Plus before depreciation, interest & Tax	863.97	NA	1,013.85	1,490.85	1,489.16	1,765.82	2,054.66	NA	2,400.89	4,012.16	5,184.49	6,774.57
4.	Depreciation and DRGZ	304.76	NA	345.39	482.71	574.49	694.59	825.50	NA	983.06	1,357.79	1,719.71	2,205.36
5.	Gross Profit (3 minus 4)	559.21	NA	668.46	1,007.81	914.67	1,071.23	1,229.16	NA	1,417.83	2,654.37	3,464.74	4,569.21
6.	I n t e r e s t s	246.73	NA	362.81	606.66	755.13	886.28	1,004.03	NA	1,399.15	1,629.71	1,922.79	2,094.65
7.	(Pre-tax Profit 5 minus 6) after setting off losses of loss making Units).	312.48	NA	305.65	420.75	159.54	185.05	225.13	NA	18.68	1,024.66	1,542.00	1,484.56
8.	Percentage of Gross margin to capital employed	12.98	NA	11.26	13.48	12.34	12.64	12.70	NA	13.19	18.29	19.54	19.32
9.	Percentage of Gross Profit to capital employed	8.40	NA	7.42	9.29	7.58	7.66	7.60	NA	7.79	12.10	13.06	11.94

S O U R C E : B.E.P.I's Reports of various years.

TABLE - 2

GROWTH OF SALES IN PUBLIC ENTERPRISES

(Rs. in crores)

Years	Manufacturing Enterprises			Service Enterprises			T O T A L			
	Sales	Capital employed	% age of sales to cap.emp	Sales	Cap.emp.	% age.	Service	%age of growth	Cap.emp.	% age sale to capital employed
1	2	3	4	5	6	7	8	9	10	11
1974-75	5925L	4718L	125.58	4260L	1936	220.04	10185	48.58	6654	153.0
1975-76	7089	5682	124.76L	4599	3324	138.36	11,668	14.76	9006	129.78
1976-77	9351	6631	141.02	5560	4426	125.62	14,911	27.58	11057	134.86
1977-78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978-79	11087	7202	153.94	6933	4863	142,57	18,020	20.86	12065	149.36
1979-80	12177	8307	146.59	6884	5662	121.58	19,061	5.78	13869	136.45
1980-81	155226	10001	152.24	8064	6181	130.46	23,290	22.19	16182	143.93
1981-82	18618	12101	153.85	10017	6106	164.05	28,635	22.95	18207	157.27
1982-83	25759	14778	174.31	10723	7157	149.83	36,482	27.40	21935	166.32
1983-84	30970	17959	172.45	11019	8567	128.62	41,989	15.09	26526	158.29
1984-85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1985-86	34707H	19935H	174.10	12587	9961	126.36	47,294	12.64	29896	158.20

SOURCE : B.P.E's Reports, of various years.

crores to Rs. 9,961 crores; the variance rate being 4.1.

The analysis reveals that the service public enterprises are using more additional capital than actually done by the manufacturing enterprises. The service enterprises have manifested fluctuating growth of sales. Sales as a ratio of capital employed was highest in 1974-75 at 220 % and lowest at 121.58 % in 1979-80. In subsequent years, it fluctuated both ways, upwards and downwards. The inference to be drawn is that the additional capital employed in public service enterprises has not yielded higher growth at a steady rate. The erratic performance has actually undermined the performance of public sector enterprises as a whole. The lowest ratio of sales to capital employed was 130% in 1975-76 and highest 166% in 1982-83. In other years, the ratio is less than that for 1982-83 and higher than that of 1975-76. The growth of sales has actually been arrested by the poor performance of public sector enterprises.

In relation to sales volume and capital employed, public enterprises of the years 1974-75, 1984-85 and 1985-86 as depicted in the table-3 for sales volume and capital employed. In 1974-75, total sales volume was Rs. 10,185 crore which increased to Rs. 47,294 crores.

TABLE - 3

SALE VOLUME & CAPITAL EMPLOYED

(Rs. in Crores)

Years	No.of Enterprises	Sales	Annual Growth rate of sales %	Capital employed	Ratio of turnover to capital employed.
1974-75	120	10,185	48.6H	6,654	153.1
1975-76	NA	NA	NA	NA	NA
1976-77	NA	NA	NA	NA	NA
1977-78	125	11,688	14.8	9,006	129.8L
1978-79	149	14,911	27.6	11,057	134.9
1979-80	155	18,020	20,0	12,065	149.4
1980-81	159	19,061	5.8L	13,969	136.5
1981-82	169	23,290	22.2	16,182	143.9
1982-83	168	28,635	23.0	18,207	157.3
1983-84	188	36,482	27.4	21,935	166.3H
1984-85	193	41,989	15.1	26,526	158.3H
1985-86	201	47,294	12.6	29,896	158.2

S C U R C E : Compiled by the Research Scholar from B.P.E's Reports

TABLE - 4

SALES VOLUME AND CAPITAL EMPLOYED

Manufacturing Enterprises

(Rs. in Crores)

Years	No. of Enterprises	Sales	Annual Growth rate of sales %	Capital employed	Ratio of turnover to capital employed
1974-75	78	5,925	65.2H	4,718	125.6
1975-76	90	7,089	18.6	5,682	124.8L
1976-77	NA	NA	NA	NA	NA
1977-78	99	9,351	31.8	6,631	141.0
1978-79	104	11,087	18.6	7,202	153.9H
1979-80	106	12,177	9.8L	8,307	146.6
1980-81	NA	NA	NA	NA	NA
1981-82	115	15,226	25.0	10,001	152.2
1982-83	116	18,618	22.3	12,101	153.9
1983-84	136	25,759	38.4	14,778	174.3H
1984-85	140	30,970	20.2	17,959	172.4
1985-86	146	34,707	12.1	19,935	174.1

SOURCE : Compiled by the Research Scholar from B.P.E's Reports, Bureau of Public Enterprises, New Delhi.

TABLE - 5

SALE VOLUME & CAPITAL EMPLOYED
IN SERVICE ENTERPRISES

(Rs. in Crores)

Years	No.of Enterprises	Sales	Annual growth rate of sales %	Capital employed	Percentage Ratio of turnover to capital employed
1974-75	42	4,260	30.3H	1,936	220.0H
1975-76	NA	NA	NA	NA	NA
1976-77	NA	NA	NA	NA	NA
1977-78	45	4,599	8.0	3,324	138.4
1978-79	50	5,560	20.9	4,426	125.6
1979-80	51	6,933	24.7	4,863	146.6
1980-81	53	6,884	0.70L	5,662	121.6L
1981-82	54	8,064	17.1	6,181	130.5
1982-83	52	10,017	24.2	6,106	164.1
1983-84	52	10,723	7.0	7,157	149.8
1984-85	53	11,019	2.8	8,567	128.6
1985-86	55	12,587	14.2	9,961	126.4

SOURCE : B.P.E's Annual Reports of various years.

Similarly, the service enterprises have registered variance in sales to capital employed from 122% to 220%, the annual rate being 0.8% (Table-5). This analysis also indicates that PES have not been putting up their performance.

The Annual growth rate of sales varies within the range of 5.8% to 48.6%. The variance rate for the sales is 4.30. The capital employed also tended to grow from Rs. 6,654 crores in 1974-75 to Rs. 2,989 crores in 1985-86. The range of variance for capital employed extends from 130% to 166%, the annual variance rate being 3.6. It is thus, apparaent from the table that the growth of sales has not been fast enough during the period under review.

The slow growth of sales in Public Enterprises can be explained with the help of comparative analysis of sales volume of the manufacturing enterprises and service enterprises separately as presented in the table-4. The range of variance in sales volume and capital employed of manufacturing enterprises is 125% to 175% with an annual variance rate of 2.5%.

It is worth analysing the group-wise sales growth to determine the performance of individual groups in public sector enterprises. Turnover of 146 units of manufacturing and 55 service enterprises has been presented in Table-6. The analysis is related to the immediately following two years (1984-85) and 1985-86. Though it is difficult on the basis of limited data to pronounce any judgement on the perspective performance, the Research Scholar is able to

measure the extent of variance in the gross turnover and that of turnover growth rate. Steel Industry tops the list of the twelve manufacturing enterprises with highest gross turnover in both the years. The agro-based industry has registered smallest turnover. The variance between the lowest and the highest can be seen from the difference in the turnover for Steel and agro-based industries from Rs. 3,510 crores for Steel to Rs. 61 crores for agro-industry. Measuring the variance in the growth rate, it is found that coal has registered the highest growth rate of 188% during 1984-85 and 1985-86 and the steel has registered the lowest growth rate of 3%.

Of services Public Enterprises, trading and marketing enterprises occupy the highest position in terms of the gross turnover. The lowest position is assigned to industrial development and consultancy. Development of small industries has registered the highest growth rate in turnover e.g. 42%. On the other end of the scale is the negative growth of 13.94% for Industrial Development and Technical Consultancy.

Applying another test of efficiency to Public Enterprises, the comparative analysis of the net turnover and capital employed for the period of two years, 1984-85 and 1985-86 is undertaken by the Research Scholar in Table-7. The range

of investment in manufacturing enterprises is from Rs. 35 crores in Agro-based industries to Rs. 3,000 crores in steel. The Research Scholar found a positive relationship between the size of the capital employed and the size of the net turnover. The highest position in turnover is occupied by the steel and the lowest by the Agro-industries.

The efficient use of capital can be measured in terms of the proportion of net turnover to capital employed. Petroleum has significant ratio of net turnover to capital employed. The petroleum industry has registered the per cent ratio of 352.79, generating a sales of Rs. 4 per rupee of investment. The power industries ratio of net turn-over to capital employed is the lowest, 13.61%. In other words 1 rupee of investment generated a sale of 14 paise. The ratios of net turn over to capital employed for other manufacturing industries lie within this range.

Trading and marketing industry occupies the highest position among service public enterprises with a percent ratio of 207. In trading and marketing 1 rupee of investment generates a turnover of rupees 2.07 paise. Financial services come to the lowest place. The turn-over capital employed ratio in public financial institutions is 7.28%.

It is interesting to note that 70% of the gross turnover is held by 10 public corporations engaged in three distinct activities, viz., fuel and power, manufacturing and trading.

Fuel and Power Sector comprises Indian Oil Corporation Ltd., Oil and Natural Gas Commission, CIL, Bharat Petroleum Corporations Ltd. and holds 43% of the gross turnover. The manufacturing enterprises include the SAIL, BHEL which together hold 9% of the total gross turnover. The trading group of companies, including F.C.I., S.T.C., M.M.T.C.. Control 18% of the total gross turnover. The manufacturing enterprises have done better than the service enterprises. The question as to whether there is a scope for improvement is a moot point. The Research Scholar has endeavoured to examine the question with the help of capacity utilisation in the following paragraphs.

TABLE - 6

GROUPWISE GROSS TURNOVER WITH PERCENTAGE OF GROWTH

(Rs. in Crores)

Sl. No.		No. of Enterprises 1985-86	No. of Enterprises 1984-85	Gross Turnover 1985-86	Gross Turnover 1984-85	Percentage of growth (+) Decline(-)
1	2	3	4	5	6	7
(A)	Enterprises Producing Goods:-					
1.	Steel ...	6	6	3,509.78H	3,408.03	2.99L
2.	Minerals & Metals	13	13	820.08	664.63	23.39
3.	Coal	5	5	2,169.03	1,919.64	13.00
4.	Power	2	2	170.92	59.35	187.99H
5.	Petroleum	12	12	20,424.25	18,403.80	10.98
6.	Chemical, Fertilizers and Pharmaceuticals.	25	22	2,543.16	2,206.36	15.25
7.	Heavy Engineering	14	14	1,795.10	1,611.21	11.41
8.	Medium & Light Engineering	20	19	1,201.48	1,008.07	11.41
9.	Transportation Equipment	12	11	1,084.34	813.64	19.19
10.	Consumer Goods ...	14	14	278.84	255.41	33.27
11.	Agro based products.	10	10	61.23L	47.78L	9.17
12.	Textiles ...	13	12	649.34	571.89	13.54
	TOTAL :	146	140	34,707.55	30,969.71	12.07

(Rs. in crores

1	2	3	4	5	6	7
(3)	Enterprises Rendering Services :-					
1.	Trading & Marketing	19	18	9,289.80H	7,976.H	16.46
2.	Transportation Service	9	9	2,044.58	1,928.64	6.01
3.	Contract & Construction	7	7	643.15	506.36	27.01
4.	Industrial Development and Technical Consultancy.	11	10	251.14	291.83	13.94L
5.	Development of Small Industries	1	1	27.30L	19.25L	41.82H
6.	Tourist Services ...	2	2	68.97	62.11	11.04
7.	Financial Services ..	3	3	145.23	128.50	13.02
8.	Section 25 companies	3	3	116.60	105.28	10.75
9.	T O T A L :	55	53	12,586.77	11,078.88	14.28
	GRAND TOTAL :	201	193	47,294.32	41,988.59	12.64

SOURCE : B.P.E's Annual Reports of various years.

TABLE - 7

GROUPWISE NET TURNOVER AND PERCENTAGE OF NET TURNOVER TO CAPITAL EMPLOYED

(Rs. in Crores)

		Net Turnover		Capital Employed		Percentage of net turnover to capital employed	
		1985-86	1984-85	1985-86	1984-85	1985-86	1984-85
1	2	3	4	5	6	7	8
(A)	Enterprises Producing Goods.						
1.	Steel	3,276.90H	3,148.58H	3,000.14H	3,264.34H	109.22	96.45
2.	Minerals & Metals	771.03	622.82	1,617.85	1,601.43	47.66	38.80
3.	C o a l	2,168.43	1,919.46	2,551.63	2,120.54	84.98	90.52
4.	P o w e r ...	162.21	56.18	1,191.97	432.05	13.61L	13.03L
5.	Petroleum ...	17,830.00	16,392.30	5,054.03	3,978.29	352.79H	412.04H
6.	Chemicals, Fertilizers & Pharmaeeuticals	2,383.21	2,070.33	2,271.64	2,560.06	104.91	80.86
7.	Heavy Engineering	1,675.80	1,521.08	1,245.19	1,256.54	134.58	121.05
8.	Medium & Light Engg.	1,152.34	966.87	1,051.91	899.79	109.55	107.46
9.	Transportation Equp.	1,050.12	784.86	1,204.31	949.39	87.20	82.67
10.	Consumer Goods.	276.49	253.37	218.49	382.40	126.55	66.26
11.	Agro based products	58.91L	45.17L	35.18L	29.67L	167.45	152.24
12.	Textiles	617.76	545.96	492.80	485.66	125.36	112.42
	T O T A L	31,423.20	28,326.98	19,935.14	17,959.16	157.73	157.73

Contd....

(Rs. in Crores)

1	2	3	4	5	6	7	8
(B)	Enterprises Rendering Services :-						
1.	Trading & Marketing	9,282.72	7,973.77	4,821.33	3,850.83	192.53	207.00H
2.	Transportation Services	1,936.54	1,826.86	1,995.76	2,039.96	97.03	89.55
3.	Contract and Construction	643.15	506.36	369.71	276.73	173.96	182.98
4.	Industrial Development & Technical Consultancy.	250.42	291.68	154.37	146.71	162.22	198.81
5.	Development of Small Industries	27.28	19.25	44.20	34.99	61.72	55.02
6.	Tourist Services	68.97	62.11	99.64	96.60	69.22	64.30
7.	Financial Services	143.09	126.43	2,079.96	1,737.66	6.88	7.28L
8.	Section 25 Co.	116.60	105.28	395.72	383.28	29.47	227.47
9.	—						
	T O T A L :	12,468.77	10,911.74	9,960.69	8,566.76	125.18	127.37
	GRAND TOTAL :	43,891.97	39,238.72	29,895.83	26,525.92	146.82	147.93

SOURCE : B.P.E's Annual Reports.

TABLE - 8

TOP TEN ENTERPRISES IN TERMS OF GROSS TURNOVER

(1985-86)

(Rs. in Crores)

Sl No.	Name of the Enterprises	Gross Turnover	Percentage to total turnover
1	2	3	4
1.	Indian Oil Corporation Ltd.	10,286.57	21.75
2.	Food Corporation of India	4,870.46	10.30
3.	Oil & Natural Gas Commission	3,451.92	7.30
4.	Steel Authority of India Ltd.	3,147.71	6.65
5.	Hindustan Petroleum Corp.Ltd.	2,460.79	5.20
6.	Steel Trading Corp. of India Limited	2,215.03	4.68
7.	Coal India Limited	2,169.03	4.59
8.	Bharat Petroleum Corp. Ltd.	1,871.06	3.96
9.	Bharat Heavy Electrical Ltd.	1,324.72	2.80
10.	Minerals & Metals Trading Corporation of India Ltd.	1,310.64	2.77
	TOTAL :	33,107.93	70.77
	TOTAL OF ALL ENTERPRISES :	47,294.32	100.00

SOURCE : B.P.E's Annual Reports, Bureaue of Public Enterprises, New Delhi.

The Table No. 9 depicts an overall view of performance of the public enterprises in accordance with the major groups, namely enterprises producing goods and enterprises rendering services separately between 1979-80 to 1984-85. The number of enterprises in operation producing goods has risen to 151 in 1984-85, from 115 in 1979-80. Similarly, the number of units rendering services increased from 53 to 56 units.

The number of profit making enterprises increased to 155 in 1984-85 from 100 in 1979-80. Out of 100 enterprises in 1979-80, the production and service enterprises making profit stood at 66 and 34 respectively, and similarly in 1984-85 the 77 production and 38 service enterprises earned profit.

In 1979-80, there were 68 loss incurring units comprising of 49 goods producing units 19 service units. In 1984-85, there were 92 units which suffered losses, out of which 74 were the manufacturing units and 18 service enterprises.

Of the total production enterprises in operation, the number of profit making enterprises came down to 51% in 1984-85 from 57.4% in 1979-80. On the contrary, the number

of loss incurring units to the total units in operation belonging to production went up by 6.4%, that is from 42.6% to 49% during this period. Whereas, the number of profit making units to total units rendering services increased from 64.1% to 67.8% during this period. "Net profit after tax of production enterprises increased from Rs. 378.84 crores in 1979-80 to Rs. 1,318.3 crores in 1984-85.

The enterprises producing goods have shown losses of Rs. 454.54 crores in 1984-85. All the enterprises engaged in producing goods have, on the other hand, witnessed an improvement in terms of net profit after tax. It increased from Rs. 78.51 crores (in negative) to Rs. 863.79 crores between 1979-80 and1984-85. Similarly, the enterprises engaged in rendering services, increased from Rs. 4.23 crores to Rs. 64.78 crores during the period under review. As a result, it is evident that all the enterprises in operation have shown rising trend in profit after tax .

Profit earned by the Public Enterprises have been fluctuating from year to year. Therange of fluctuation in profit extends from the loss of 19.77 crores in 1980-81 to the highest profit of Rs. 64.78 crores in 1984-85. The profit growth rate for the year 1979-80 was 10%. In 1980-81, the Public Enterprises registered a negative rate of growth

of 91%. Looking at the figures of sales presented in earlier Tables I discern growth of 23%. The reason for loss are not difficult to find; high cost of production is alone responsible for the losses which is not justified by the growth of sales. The organisation cost requires production and sales at still higher level which is not possible unless Public Enterprises become conscious of the need for greater productivity. 1981-82 is exception to the normal trend in profit of Public Enterprises. The growth is 5.295%. The higher growth rate is the result of profit in 1981-82 after two years of losses; 1979-80 and 1980-81. However, the sales improved and the growth rate was 27%. The highest profit growth rate of 50% is registered by Public Enterprises, in 1982-83. In contrast, there is a decline in the sales growth; it declined to 15%. 1983-84 is the year of negative growth rate in profit of Public Enterprises i.e. 3.8%. The sales has also grown at a lower rate of 13%. For the whole period, the trend has not been steady either in sales or in profit. 1980-81 and 1981-82 are the y ars characterised by rising trend in the growth of sales. 1981-82 has witnessed sharp increase in growthrate of profit alone, from 91% to 52.94%. 1981-82, apart, the Public Enterprises have shown negative rate of growth in profit.

The performance of Public Enterprises has not been satisfactory. All of them except petroleum industry which consists of 11 units are in the red. The accumulated losses during 1979-80 and 1984-85 has eroded 39.2% of the paid up capital. Examination of this aspect has been undertaken by the Research Scholar with the help of the data presented in Table-10. The table clearly shows profit of the Petroleum Industry which is higher than that of all the Public Sectors manufacturing enterprrises (including Petroleum Industry). The Public Enterprises have actually incurred ever increasing losses during 1979-80 and 1984-85. The losses of the Public Enterprises other than Petroleum Industry, increased from Rs. 236.68 crores to Rs. 253.20 crores, during the period under review. The net losses, after tax of Public manufacturing enterprises except petroleum group increased to Rs. 763.33 crores in 1983-84. The total losses for all the units excluding Petroleum Industry amounted to Rs. 15,584.03 crores till 1984-85, which accounted for erosion of 39.2% of the share capital.

TABLE - 9

NET PROFIT AND LOSS AFTER TAX EARNED BY PRODUCTION AND SERVICE ENTERPRISES DURING 1979-80 to 1984-85

Sl. No.	Particulars	No. Enterprises Producing goods.	No. Enterprises Rendering services	Total Number	Net Profit/Loss After Tax Enterp.P.G.	Enterp.R.S.	Total
1	2	3	4	5	6	7	8
1.	No. of Companies covered						
	1984-85	151 (100 %)	56 (100 %)	207 (100 %)	863.79	64.78	928.57
	1983-84	146 (100 %)	55 (100 %)	201 (100 %)	249.42	(-) 3.75	245.67
	1982-83	140 (100 %)	53 (100 %)	193 (100 %)	594.01	23.84	617.85
	1981-82	134 (100 %)	52 (100 %)	186 (100 %)	421.03	63.55	484.58
	1980-81	116 (100 %)	52 (100 %)	168 (100 %)	(-)162.24	(-) 19.77	(-) 182.01
	1979-80	155 (100 %)	53 (100 %)	168 (100 %)	(-) 78.51L	4.23	(-) 74.28

Contd...

(Rs. in Crores)

1	2	3	4	5	6	7	8
2.	No. of Profit Making Companies						
	1984-85	77 (51.0)	38 (69.8)	155 (55.6)	1,318.33	101.40	1,420.23
	1983-84	71 (48.6)	38 (69.8)	109 (54.2)	1,117.12	65.32L	1,182.44
	1982-83	74 (52.9)	37 (69.8)	111 (57.5)	995.78	82.97	1,078.75
	1981-82	67 (50.0)	39 (75.0)	106 (57.0)	682.97	89.13	772.10
	1980-81	60 (51.7)	34 (65.4)	94 (56.0)	173.22	65.65	238.87
	1979-80	66 (57.4)	34 (64.1)	100 (59.5)	378.84	84.65	463.49

Contd...

(Rs. in Crores)

1	2	3	4	5	6	7	8
3.	No. of Loss Incurring Companies						
	1984-85	74 (49.0)	18 (32.2)	92 (44.4)	454.54L	37.12L	491.66
	1983-84	75 (51.4)	17 (30.9)	92 (45.8)	967.70	69.07	936.77
	1982-83	66 (47.1)	16 (30.2)	82 (42.5)	401.77	59.13	460.90
	1981-82	67 (50.0)	13 (25.0)	80 (43.07)	261.94	25.58	287.52
	1980-81	56 (48.3)	18 (34.6)	74 (44.0)	335.46	85.42	420.88
	1979-80	49 (42.6)	19 (35.9)	68 (40.5)	457.35	80.42	537.77

Figures within brackets indicate perceentage.

SOURCE : Government of India, Ministry of Finance, Public Enterprises Survey from 1979-80 to 1984-85.

TABLE - 10

ANALYSIS OF SALES & PROFIT GROWTH

Years	Sales growth %	Profit growth %
1979-80	16 %	(-) 10 %
1980-81	23 %	91 %
1981-82	27 %	5,294 %
1982-83	15 %	50 %
1983-84	13 %	(-) 3.8%
1984-85	18 %	(-) 15 %
(Average Growth)		

SOURCE : Computed by Research Scholar from Table No. 1

TABLE - 11

NET PROFIT/LOSS AFTER TAX EARNED BY PRODUCTION ENTERPRISES OTHER THAN BELONGING TO PETROLEUM GROUP DURING THE YEARS 1979-80 to 1984-85

(Rs. in Crores)

Years	Enterprises producing goods			Net Profit After tax earned by enterprise producing petrol. products	Net profit loss earned by enterprises other than enterprises producing petrol products (4-5)
	Profit Enterprises	Loss incurring Enterprises	Nal. Net Profit/Loss (2-3)		
1	2	3	4	5	6
1984-85	1,318.33	454.54	883.79	1,116.99	(-) 253.20
1983-84	1,117.12	878.70	249.42	1,012.75	(-) 763.33
1982-83	995.78	401.77	594.01	925.61	(-) 331.60
1981-82	682.97	261.99	421.03	594.70	(-) 173.67
1980-81	173.22	335.46	(-) 162.24	156.96	(-) 319.20
1979-80	378.84	457.35	(-) 78.51	158.17	(-) 236.78

SOURCE : B.P.E's Report (1979-80 to 1984-85) Government of India, Ministry of Finance, New Delhi

MACRO PICTURE OF CAPACITY UTILISATION

Capacity utilisation is an important index of performance of an enterprise. Low capacity depresses profit and raises the cost unnecessarily. Successful management must attain optimum capacity to produce goods at minimum cost and maximum revenue. The Research Scholar has presented distribution of the units falling in three ranges of capacity utilized during 1977-78 and 1985-86. In 1975-76, 62% of the units surveyed utilized more than 75% of the capacity, 25% utilised capacity from 50% to 75%; less than 50% of the capacity was utilized by 13% of the units surveyed. In 1978-79, 65% of the enterprises are shown in the Table-12 utilizing 75% of the capacity; there is improvement of 4% in capacity utilization. However, the number of units in the range of 50% to 75% has fallen and that of the units utilizing capacity less than 50% increased 21% and 15% respectively. In 1979-80, the proportion of units utilizing capacity more than 75% has substantially decreased to 55% and that of units in the range of 50 to 75% and 50% both has increased to 24% and 21% respectively.

There is further decline in the ratio of enterprises belonging to the capacity utilisation range of more than 75%. In one year alone, 1980-81, the proportionate number

of enterprises fell to 47%, though there is increase in the number of units belonging to the range of 50% to 75% (from 24% to 32%). The capacity utilized within the range of less than 50% does not show any change in the porportionate trend of enterprises. 1981-82 shows no variation in the capacity utilization from 1980-81.

The plus point of the whole analysis is that quite a good number of units belong to the highest range of capacity utilization, more than 75%. The number of units is almowt equally distributed between the two ranges, 50 to 75% and less than 50%. On average 50% of the units surveyed utilized more than 75% of the capacity during 1977-78 and 1985-86. In each of the ranges of 50% to 75% and less than 50%, the porportionate number of enterprises is 25%.

The general trend for the Public Enterprises in respect of capacity utilization is fluctuating. The range of fluctuation in number of enterprises belonging to capacity utilization of more than 75% is 14%, from the 1979-80, to the heighest 79% in 1978-79. The range of variance in the number of units with capacity utilization between 50% to 75% is 8%, from the lowest 21% in 1978-79 to the highest of 29% in 1983-84. The range of variance is 8% for units with

TABLE - 12

CAPACITY UTILIZATION IN PUBLIC ENTERPRISES

	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
Units under Production	112	117	129	131	133	150	148	164	172
(a) Units which have recorded capacity utilization of more than 75%	69 (61.61%)	76 (64.95%)	71 (55.03%)	62L (47.32%)	62L (46.6%)	69 (646%)	80 (54%)	90 (55%)	88 (51.2%)
(b) Units where capacity utilization has been between 50-75%- (25%	28 (25%)	24 (20.5%)	31 (24.03%)	42 (32.06%)	43 (32.33%)	39 (25%)	43 (29%)	43 (26%)	49 (28.5%)
(c) Units where capacity utilisation was less than 50%	15 (13.4%)	17 (14.52%)	27 (20.93%)	27 (20.6%)	28 (21.05%)	42 (28%)	25 (17%)	31 (19%)	35 (20.3%)

SOURCE : B.P.E's Annual Reports of various years.

capacity utilization of less than 50%, from 19% in 1984-85 to the highest of 28% in 1982-83. The trend in respect of highest range of capacity utilization is declining. The trend in capacity utilization of 50% to 75% is not steady; it changes from year to year. The same is true of lowest range.

The fluctuatin trend in capacity utilization which is discernible in Table No.12 is the cumulative effect of low productivity in public enterprises. To pin point the industries with unsatisfactory utilization of capacity, the Research Scholar has taken group wise analysis. The Table - 13 below shows the gains of higher capacity utilization nullified by the equal, number of units showing very low utilization of capacity. Hence, it is at the rate

TABLE - 13

STEEL :- Trend in Capacity Utilization.

Range	1983-84	to	1985-86
More than 75%	4 Units		50%
50% to 75%	2 Units		25%
Less than 50%	2 Units		25%

Source :- Compiled and computed by Research Scholar from several years B.P.E's Reports. Ministry of Finance, New Delhi.

required that the problems of low capacity utilization should be dealt with effectively. "Severe power restrictions imposed on the Steel plant especially by ORISSA State Electricity Board on R.S.P. and D.V.C. on Durgapur, Bokaro and IISCO Plants affected production.[1] The poor quality of coking coal also accounted for the deterioration in capacity utilization. The Salem Steel plant is unable to normalise its production due to stiff competition from mine-steel plants and rerollers. The problem of Salem Steel Plant is its large capacity. The Mishra Dhatu Nigam Limited also works at low capacity owing to the teething problems. In brief, the Steel Industry's capacities utilization is affected by fuel, power and competition in the production market from mini-steel plants.

The coal and lignite group of industries are operating above 75% of capacity. The average capacity utilization in the coal sector is 89%. In 1985-86, coal production was affected by fluctuation in power supplies absentee on land acquisition problems and poor maintenance of the machines. During rainy seasons, the coal production has to be stopped due to mine inundation. The coal industry suffered a loss of 11 M.Ts of production due to such factors in 1983-84.

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1. B.P.E's Report, 1983-84, P.206.

Minerals and Metals group of enterprises do no show a satisfactory utilization of capacity. As evident from the Table 14, below, 59% of the enterprises belong to capacity utilization range of 50% to 75%. Only a few (23% of the units) are able to operate above 75% of the capacity. The low capacity is the result of inadequate power supply.

TABLE - 14

MINERALS AND METALS :- TREND IN CAPACITY UTILIZATION

Range	1983-84 TO 1985-86	
	No. of Units.	Percentage
More than 75%	5	23%
50% to 75%	13	59%
Less than 50%	4	18%

SOURCE : Compiled and computed by Research Scholar from B.P.E.'s Annual Reports of various years.

BALCO serves as an example of low capacity utilization due to inadequate power supply in 1983-84. In some public sector enterprises, old plants have not been properly maintained due to which the work has to be

stopped frequently-Bharat Coal Mines which has a capacity of 5,81,000 tonned was content with a production of 4 lakh tonnes due to its inability to work reserves in depth with old plants. In some cases, the production was below normal capacity because of poor demand for the product. The Bharat Refractories had a similar problem. The capacity utilization is also affected by shortage of essential inputs as in the case of H.C.L. Plants where the work was stopped due to shortage of liquid oxygen and detonators. Industrial relations also took its toll in some of the public enterprises. Production in H.Z.L. (Visakhapatnam) was less because the plants were closed for one month in June-July due to disturbed industrial relations. The foreign Governments failure to lift its share of the output at some of the M.M.T.C. Enterprises also added to low production and low capacity utilization. Failure of Iranian Government to lift the concentrate from Kudremukh is an example in sight.

In brief, the problem of M.M.T.C. Public Enterprises resulting in low capacity utilization range from power shortage, inadequqte orders, distrubed labour relations to international conflicts.

Petroleum Industry is an outstanding example of the public sector which operate above 75% of the installed capacity. Only two units at Visakhapatnam operated in the range of 50% to 75%.

The Fertilizer Group of public enterprises show low capacity utilization. Only 23% of the enterprises have utilized more than 75% of capacity, 36% of them operated capacity in the range of 50% to 75% and 41% were not able to operate upto 50%.

The major problems of the industry consisted in inadequate power and water supply.

TABLE - 15

Fertilizer :- Trend in Capacity Utilization

Range	1981-82 TO 1985-86		Average
	Units	Percentage	
More than 75%	5	23	
50% to 75%	8	36	33.3%
Less than 50%	9	41	
T O T A L :	22	100%	

SOURCE : Compiled and computed by Research Scholar from B.P.E's Reports of various years.

Production of Madras, Rourkela, Cochin plants was affected by such factors. Maintenance of equipment, process problems, unforseen breakdown also affected production in some of the plants.

All the units of chemicals and pharmacuticals industries have not been able to utilise more than 75% of capacity because of such factors as inadequate supply of essential inputs, low consumption of bulk drugs like penincillin, low market demand, power and water constraints. Hyderabad plan specially lost

TABLE - 16

CHEMICAL AND PHARMACEUTICALS:
TREND IN CAPACITY UTILIZATION

Range	1982-83 TO 1985-86	
	Units	Percentage
More than 75%	14	64
50% to 75%	4	18
Less than 50%	4	18

SOURCE : Computed by Research Scholar from B.P.E's Reports of various years.

production due to low market demand for bulk drugs. Similar problems were also faced by Maharashtra Antibiotics and Orissa Drugs and Pharmaceuticals.

The heavy engineering Industry has multiplicity of product and changing product-mix in tune with the demand pattern. It poses a serious problems for Research Scholar to determine the capacity limit. However, an attempt is made to measure the capacity utilisation in the following Table-17. The main product of the company is wagon which dovetailed with the orders from Railways. The orders keep changing from year to year according to funds position. The funds constraints had affected the wagon-off-take by Railways from Bharat Wagon and Engineering Company. The Company had to impose restrictions on the production of wagons and supply of such items as wheels and couplers. In H.E.C., power constraints and poor maintenance of equipments, inadequate load in certain centres liquidity problems and non-availability of spare parts had affected the production and utilization. The production of paper machinery and Road Rollers in Jessops was affected by low demand in the market.

TABLE - 17

Heavy Engineering : Trend in capacity utilisation

Range	1982-83 TO 1985-86		Average
	Units	Percentage	
More than 75%	7	32%	
50% to 75%	11	50%	27%
Less than 50%	4	18%	
T O T A L :	22	100%	

SOURCE : Compiled and computed by Research Scholar from B.P.E's Annual Reports of various years.

N.A.M.C. performance was also adversely affected by inadequate orders. In brief, inadequate supply of inputs lack of proper maintenance of plants, the Railways failure to lift the wagons and power constraints are responsible for low capacity utilisation in Heavy Engineering.

The Light and Medium Engineering has a changing product-mix which gives rise to different pattern of work loads for different work centres. In Bharat Electronics Ltd. production is adversely affected by such imbalance in the work-load. The production of I.T.I. Palghat unit was affected by the lack of defence Ministry's approval to certain changes in design for work manufacture.

TABLE - 13

Light and Medium Engineering : Trend in Capacity Utilization

Range	1982-83 TO 1985-86	
	Units	Percentage
More than 75%	24	86%
50% to 75%	3	11%
Less than 50%	1	3%
T O T A L :	28	100%

SOURCE : Compiled and computed by Research Scholar from B.P.E's Annual Reports.

In short, the bureaucracy and changing product-mix are the twin problems of the Light and Medium Engineering public enterprises.

The transportation Industry comprises twelve (12) units. The performance in transportation equipment group of public enterprises is affected by such factors as poor order book position, industrial unrest, low productivity obxolete technology and stiff competition. The C.I.W.T.C. Unit and Hindustan Shipyard's performance have been affected by insufficient order book position and low labour productivity. The coaching shipyard has suffered the loss of production due to industrial unrest. The National Bicycle Corporation

uses obsolete technology and is unable to achieve better capacity utilisation because of inadequate working capital. The Scooters India Ltd. is unable to expand production due to Static off-take in a competitive market.

Consumer goods Industries of Public Sector has not been able to attain higher level of capacity utilization due to such factors as demand constraints, inadequate power and water supply, labour strike, shortage of inputs and improper maintenance of plants and machines. Artificial Limbs Manufacturing Company Ltd. suffered from demand constraints. Shortage of Steam and Water was the main problems of Mandy National Paper Mills. Breakdown in Coal fired boilers affected the performance of Nagaland Pulp and Paper Company. The prolonged industry-wise strike affected production in NJMC Mills. Non-availability of essential inputs and shortage of essential inputs were among the production constrainst in Dannery and Footwear Corporation Ltd.

TABLE No. 19

Transportation:- Trend in Capacity Utilisation

Range	1981-82 TO 1983-84		Average
	Units	Percentage	
More than 75%	5	42%	29%
from 50% to 75%	2	16%	
Less than 50%	5	42%	

SOURCE : Compiled and computed by Research Scholar from B.P.E's Report 1983-84.

TABLE - 20

Consumer Goods :- Trend in Capacity Utilization

Range	1981-82 TO 1983-84 Units	Percentage
More than 75%	4	33%
50% to 75%	3	25%
Less than 50%	5	42%

SOURCE :. Compiled & computed by Research Scholar from B.P.E's report 1983-84

The public enterprises are still overburdened with large inventories. The norm has not been followed on uniform basis by the public enterprises. Public enterprises are holding inventories ranging from 93% of the value of production to 7%. The variation within the Industry is also quite wide. Analytical study of variance in inventories in public enterprises has been attempted by Research Scholar in the following Table - 21. The range of variance between the industry in 1982-83 extended from 7% to 93% of the total. Inspite of various suggestions by the B.P.E. for the minimum inventories have produced no results because in 1984 as well as the inventories were held by public enterprises in the same ranges from 7% to 93% of the total output.

TABLE - 21

ANALYSIS OF VARIANCE IN INDUSTRY OF PUBLIC ENTERPRISES

(Expressed as No.of days)

Range	1983-(31st.March) Inventory (Actual)	Production/ Sale/Turnover Variance		(1984-(31st. March) Actual (Inventory)	Production/ Sale/Turnover Variance	
1. Variance Between Industry.	Highest=425 Lowest = 32 Total =457	93% 7%	86%	Highest=441 Lowest = 34 Total =475	93% 7%	86%
2. Variance Within the Industry.	Highest=493 Lowest = 59 Total =552	89% 11%	78%	Highest=558 Lowest = 52 Total =610	91% 9%	82%
3. Comparative Variance.	$\frac{78}{86}$ 0.90			$\frac{82}{86}$ 0.95		

SOURCE : Compiled and computed by Research Scholar from B.P.E's Annual Report 1983-84.

The Scholar has also attempted variance inventory within the Industry. The range of variance in inventory, as shown in Table 21 was from 11% to 89% in 1982-83 and from 9% in 1983-84. The trend in inventories for public enterprises as a whole shows a rising trend. It has risen by 5% which is determined by the difference in the range for industry and range of variance within the industry. It is, therefore, imperative to substantially reduce inventories if there is to be improvement in capacity utilisation and reduction in cost of production.

PROBLEM OF OBSOLESCENCE :-

Public Enterprises can not be expected to maintain and improve the level of operational efficiency without making a provision of modernisation and replacement in future. The programme would involve huge funds varying from Rs. 45 crores in the case of SAIL to Rs. 1,952 crores in the case of F.C.I. The quantum of fund has been determined by multiplying the total sales with the ratio of additional capital employed to additional sales. The requirement for funds in the future for expansion amd modernisation has been given in the following Table-22.

From the Table-22 it is evident that nearly Rs. 23,506.9 crores are required to be provided for future modernisation replacement which approximately comes to 38.5% of capital employed. But in total profit before taxes for 181 companies are barely Rs. 1,570.89 crores. In order to meet the contingency, extra reserves have been provided to the tune of Rs. 22,935.01 crores; which, if provided for shall erode entire net worth of Rs. 17,329.25 crores for the year 1983-84 leaving a deficit of Rs. 5,655.76 crores.

Hindustan Petroleum, STC, Bharat Petroleum have a comparatively larger ratio. The unit like NTPC which had started production from 1982-83 onwards, has no reserve

because the company is yet to reach its full capacity utilization. The aforesaid amount of Rs. 23,506.9 crores had been built up in the course of time. If every year suitable provision is made for meeting out the contingency there may not arise the threat of obsolescence.

Though on an average the reserve required is 38.5% of capital employed, in the case of balance of 167 units, the ratio is 52.9%. If the same situation prevails, the enterprise, which are now mounted on a sinking ship, shall definitely collapse under the pressure of inflation. Therefore, it is opportune time for rescue operations to commence. It is, therefore, necessary to provide for the future before obsolescence devours the public enterprises.

The export performance of public enterprises has been analysed in the following tables 23 and 24. It depicts rising trend in the export earnings during the period 1974-75 and 1985-86. The export has risen from 1,151 crores in 1974-75 to Rs. 5,418 crores in 1985-86, except for a decline in exports in 1979-80. However, the growth rate is not uniform rather it fluctuates from year to year. For instance, the growth rate of exports earnings as shown in table 24, in 1981-82 was 4% which increased to 72% in 1984-85, but in the subsequent years 1985-86 it steeply declined to 14%.

TABLE NO. 22

COMPUTATION OF CAPITAL EMPLOYED AT CURRENT PRICES

(Rs. in Crores)

Sl. No.	Name of Companies	Sales 1983-84	Capital employed 1983-84	Sales Variance (Positive)	Capital employed variance (Positive)	Capital employed at current Prices	Modernization Replacement Resources Required.
		(a)	(b)	(c)	(d)	$e=\frac{dxa}{c}$	e-b
1.	S.A.I.L.	2937.62	7439.4	119.46	304.37	7484.71	45.31 L
2.	O.N.G.C.	2752.60	6405.46	629.25	1813.30	7932.12	1526.66
3.	F.C.I.	4870.46	4558.40	400.38	844.13	6510.17	1951.77 H
4.	I.O.C.	9130.48	2787.72	105.38	167.93	3829.57	1051.85
5.	N.T.P.C.	138.59	2459.83	122.54	810.70	1066.19	-
6.	B.H.E.L.	1228.21	2255.61	149.07	206.32	2067.93	-
7.	Rashtriya Chemicals	397.33	1074.33	329911	313.79	836.37	-
8.	Hind Petroleum	2087.07	734.41	111.07	220.31	1397.11	662.70
9.	Mazogon Dock	206.91	660.39	380.01	186.17	346.81	-
10.	S. T. C.	2210.72	519.73	106.06	160.90	936.04	416.31
11.	Bharat Petroleum	1518.88	513.22	105.59	142.36	2038.73	1525.51
12.	M.M.T.C.	1310.55	338.54	104.12	31.73	393.82	55.28
13.	Oil India	424.41	329.35	123.79	60.07	244.80	-
14.	Cochin Refinery	580.60	192.66	3417.35	34.03	159.60	-
	Sub-Total (a)	29,794.43	30,269.55	1195.93	5296.11	35,244.03	7225.39
1.	Balance 167. Companies (4)	13,764.24	30,189.88	4613.28	4089.88	47,071.39	16281.51
	GRAND TOTAL (A+B)	43,558.67	61,059.43		9355.99	72,315.42	23505.90

SOURCE : Manohar Gupta, K.P.T. Sept.,16,1985.

TABLE - 23

VALUE OF EXPORTS

(Rs. in Crores)

Years	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
Value of Exports	115	1,640	NA	NA	1,753	1,562	1,834	1,913	2,217	2,756	4,747	5,418

SOURCE : B.P.E's Annual Reports.

TABLE - 24

EXPORT EARNING OF PUBLIC ENTERPRISES

(Rs. in Crores)

Years	Export of canalised boods.	Export of non canal-ised goods	Export of Services	Total	Percentage growth from previous years
1981-81	753.82	385.34	773.82	1,912.98	4.30
1982-83	660.65	727.03	829.07	2,216.75	15.88
1983-84	611.99	1,110.09	1,033.70	2,755.78	24.32
1984-85	631.57	2,752.86	1,342.77	4,747.30	72.26
1985-86	710.18	3,276.85	1,431.11	5,418.14	14.13

SOURCE : B.P.E's Annual Reports.

The average of rate of growth in export earnings for the period 1981-82 to 1985-86 is 26%. The apparent causes for fluctuation in export earnings consist of fluctuations in the production performance enlarged domestic market, protectionism followed in Europe and America and problems of international liquidity in the third world countries besides lack of any exports strategy for concerted effort to raise export earnings from the part of public enterprises.

Better performance of Public Enterprises is ultimately related to optimum utilisation of installed capacity by which alone supply of goods at competitive prices is possible. The R.S. on the basis of the foregoing analysis has to suggest the following remedial measures :-

A. The individual enterprises from low capacity utilisation must be assisted by a team of experts to identify the specific causes of continuous low capacity utilisation.

B. The Ministries concerned must monitor the performance of Public Enterprises with a view to helping the units under them, overcome infrastructural problems and initiate the measures for improving the performance.

C. Adequate funds must be earmarked for the upgradation of technology and for the creation of captive power facilities.

D. There is a need for injecting professionalism in personnel management for better industrial relations.

E. The ancillary units which are not properly developed must receive due attention so that working of Public Enterprises is not hampered by lack of spare parts and essential inputs.

F. The avenues to reduce cost of production must be explored. It is worth reiterating to reduce the level of inventories at least to make them more competitive in foreign markets.

G. The export promotion activities must be stepped up so that the Public Enterprises do not have to suffer from wide fluctuations in the demand.

C O N C L U S I O N

The efficiency of the Public Enterprises has been appraised in two broad parameters viz. financial and physical performance. The financial performance includes profitability ratios, growth of sales and capital employed and investment in technology for modernisation and replacement. The physical performance includes thecapacity utilisation and its trends (sector-wise), inventories and export earnings.

The profitability profit of 20 units during the period 1974-75 and 1985-86 shows variance in capital employed. In 1974-75 there were 120 units in Public Enterprises with capital employed of Rs. 6,654 crores which rose to 29,896 crores in 210 enterprises in 1985-86. The profit, depreciation reserve and tax provision maintained increasing trend throughout. The additional profit and additional capital employed depicts a variance ratios of 4.73 at the level of 1%.

The study regarding growth of sales and capital employed during the period 1974-75 to 1985-86 displays that the growth of sales is larger than the growth rate of capital employed. The manufacturing sector has fared better in

increasing rate than the service sector. The service sector also lagged behind in growth of capital employed. The variance rate of growth of sales and capital employed between manufacturing sector and service sector has been 1.0 and 4.1 respectively. The range of variance in sales volume andcapital employed between manufacturing and service sectors extends from 125% to 175% (Annual rate 2.5%) and from 122% to 225% (Annual 0.8% respectively).

The group-wise sales growth analysis shows that SAIL tops the list of gross turn over and Agro-based industry register the lowest rate during the period 1984-85, 1985-86. The variance in growth rate shows that coal occupies the highest position with growth rate of 188% during 1984-85 and 1985-86 while SAIL is the last with a meagre growth rate of 3%. On the other hand, in service sector, trading and marketing occupy the highest position for the gross turnover, and lowest is the turnover of industrial development and consultancy. Comparative analysis shows that there is positive relation-ship.between the size of capital and the size of net turnover. As regards the net turnover and capital employed, SAIL and Agro-based industries to occupy highest and lowest position respectively during the period under review. The proportion of net-turn over to capital employed shows that Petroleum Industry has a per cent ratio of 352.70%, i.e. 1 rupee of investment generates a sale of Rs. 4. On the contrary the power

industry registers a tiny ratio of 13.6%. (It has been observed that the Public Enterprises have held 70% of the total gross turnover).

The profit earned by Public Enterprises has been fluctuatin from year to year during the period 1979-80 to 1984-85. The range of fluctuation in profit extends from the loss of Rs. 19.77 crores in 1980-81 to the highest profit of Rs. 64 crores in 1984-85. The main reasons of loss are high cost of production alone which is not justified by the growth of sales. The total losses of all units in Public Enterprises except petroleum group came to Rs. 15,584.03 crores till 1984-85 which amounted to erosion of 39.2% of the share capital.

Another significant parameter for performance appraisal as applied by the Research Scholar is physical performance, consisting of the utilisation of capacity, inventories and export earnings. The Research Scholar has prepared three different ranges viz. Units utilising capacity more than 75%, units utilising capacity between 50% to 75% and units utilising capacity less than 50%. It is observed that most of the units have operated below 75% of the capacity during the period 1977-78 to 1985-86. The units like Steel, fertilizer, coal, heavy engineering, light medium engineering,

petroleum, Agro-based industries, transport and consumer goods industries have been studied by the Research Scholar. The Petroleum Industry is the only sector which utilised 75% of its capacity. The various reasons for under utilisation of capacity are production bottlenecks, power restraint, paucity of inputs, supply, strained industrial relation, unforeseen break down and poor maintenance of equipments & the changing product-Mix.

Public Sector is also gravely confronted with large inventories which rangesfrom 7% to 93% of the value of production in a year. Thisis exorbitant level of inventories by any standard. The only way-out is to ameliorate the production process for minimising the cost of production. Obsolescence is another factor growing at our Public Enterprises. The amount allocated for modernisation and replacement programmes is inadequate. The Research Scholar suggests substantial allocation for this head. The export earnings of Public Enterprises during the period 1974-75 to 1985-86 are not uniform. The growth rate ranges between 4% in 1981-82 to 72% in 1984-85 and 14% in 1985-86 with an average growth rate of 26% only. The reasons for fluctuations in growth rate are poor production performance, enlarged domestic market and protectionism adopted by Europe and America, and the problems of international liquidity together with lack of export strategy.

The Research Scholar has suggested certain remedial measures for ailing Public Sector Enterprises such as formation of expert committee to identify causes of low capacity utilisation removal of infrastructural constraints, priority to ancilliary units, and export promotion.

C H A P T E R - IV

PERFORMANCE APPRAISAL OF STEEL INDUSTRIES IN INDIA

In the previous Chapter - III entitled "Efficiency Profile of Public Enterprises", it has been bnserved by the Research Scholar that a multi-pronged approach has to be adopted to deal with the malaise ot poor and gloomy financial and physical performance. The Research Scholar has made several suggestions for efficient capacity-utilisation, improved profitability and efficient deployment of physical resources.

The present Chapter is concerned with the performance appraisal of Steel Industry. Consumption of steel per-capita is recognised as the most important index for industrial development of a country. After Independence, the Government of India assigned priority to generation of power and production of steel to ameliorate the material welfare and standard of living of the masses. Thus, steel received pivotal attention in successive plan. Consequently three units of steel came into being with the capacity of one million tonne each at Rourkela (December, 1958) Bhilai (Feb. 1959) and Durgapur (Dec.1959). Later on, Bokaro Steel Plant was established for production of more steel in the country to accelerate the pace of industrial development.

Public steel plants at present, are under the aegis of SAIL (holding Company), holding over 90% of the installed capacity in the country. There are six integrated steel plants under the SAIL. VISL is the latest addition to the Steel plants in the public sector, which produces hot metal by using electric ore furnaces. Durgapur, Bhilai, Rourkela and Bokaro in the Public Sector have completed more than two decades. TISCO, steel plant in the private sector and IISCO (which is a subsidiary of SAIL) are the oldest steel plants established more than half a century ago.

In the present chapter, the Research Scholar makes an endeavour to examine performances of steel industry which is the nucleus of our economic development. Performance of steel industry is judged both in terms of financial and social returns.

FINANCIAL PERFORMANCE

Financial return is the traditional criterion comprising profitability as a source of further public investments. Table-1 presents profitability profile of SAIL during 1978-79 and 1983-84.

TABLE - 1

PROFITABILITY PROFILE

(Rs. in Crores)

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
Gross Margin	229	189	208	257	202	86
Gross Profit	121	189	94	131	60	(-) 74
Pre-tax Profit/ Loss	39	(-) 4	(-) 27	01	(-)179	(-) 246

SOURCE : B.P.E's Reports 1983-84.

The following Table-2 presents gross margin of SAIL durin 1978-79 and 1983-84. The SAIL earned profit in all the years, though at a deceleratin rate. In 1978-79 profit of Rs. 229 crores was earned on a capital of Rs. 1,951 crores; yielding a return of 11.7%. The capital employed increased to Rs. 2,117 crores whereas, the profit decreased to Rs. 189 crores resulting in a low rate of return viz. 8.9%. The declining trend persisted till 1983-84.

In 1983-84 a profit of Rs. 86 crores was realized in the capital of Rs. 3,000 crores, the rate of return being 2.9%. With the low rate of return SAIL can hardly be expected to become self-reliant in generating resources for expansion and modernisation of its steel units.

TABLE - 2

PROFITABILITY OF SAIL

(Rs. in Crores)

Year	Gross Margin	Capital employed	Rate of return %
1978-79	229	1951	11.7
1979-80	189	2117	8.9
1980-81	208	2344	8.8
1981-82	257	2903	8.9
1982-83	202	3264	6.1
1983-84	86	3000	2.9

SOURCE : Compiled and computed by Research Scholar from B.P.E's report 1983-84.

The SAIL has been allowing the free reserves in the form of depreciation and DRE to accummulate from year to year, as can be seen in Table-3. In 1978-79, depreciation reserve amounted to Rs. 147 crores which decreased to Rs. 115 crores in 1979-80. Apparently, it does not appear that the whole amount was used for replacement. The depreciation was Rs.115 crores in 1980-81, or in other words, there was no change in its level. In subsequent years, the policy of depreciation reserve was for more profits transferred to

depreciation reserves at an ever higher rate. As a result, the SAIL has accummulated a massive amount of Rs. 163 crore in 1983-84. The policy of building large free reserves is also not conducive to consumer interest because depreciation is the cost of capital transferred to consumers.

Similarly, the free reserves in the form of depreciation which becomes a significant part of capital employed seems to have been used by SAIL to increase the loans more than equity. The Table - 4 shows clearly that

TABLE - 3

DEPRECIATION AND D.R.E.

(Rs. in Crores)

Years	Depreciation and DRE
1978-79	108
1979-80	115
1980-81	115
1981-82	126
1982-83	142
1983-84	163

SOURCE : B.P.E's report 1983-84.

TABLE - 4

GROWTH IN LOAN AND EQUITY

Years	Equity	Loan	Growth of Equity %	Growth of Loan %
1978-79	2260	4847	-	-
1979-80	2493	995	10.3	17.4
1980-81	2854	1366	14.5	37.2
1981-82	3274	1636	14.7	19.7
1982-83	3299	1850	0.8	13.0
1983-84	3505	2214	6.24	19.6

SOURCE : Worked out by Research Scholar from B.P.E's Report 1983-84.

the SAIL had actually used the free reserve for more loans which have grown by 161.3% since 1978-79 as compared with growth of 55.5% in equity. The policy is also not desirable because the return on capital is further depressed. It is apparent from Table-5.

TABLE - 5

PROFIT BEFORE INTEREST AND TAX(PBIT)

Years	Gross Profit (Rs. in Crores)	Capital employed (Rs. in Crores	Rate of Return
1978-79	121	1951	6.2
1979-80	72	2117	3.40
1980-81	94	2344	4.00
1981-82	131	2903	4.51
1982-83	60	3264	1.83
1983-84	(-) 74	3000	(-) 2.5

SOURCE : Worked out by Research Scholar from B.P.E's Report 1983-84.

The SAIL's PBIT in 1978-79 was Rs. 121 crores. In other words, the small amount of profit was the result of transfer of the profit to free reserves (Rs. 108 crores). In the subsequent years, the PBIT shrank to Rs. 72 crores. It is admitted that the decelarating profit accounts for declining PBIT, yet free reserves are non-the-less responsible for it. An amount of Rs. 112 crores was added to free reserves in 1979-80. In 1981-82, the SAIL did not follow the policy of enhancing PBIT in the tune with larger growth margin; the PBIT was still Rs. 94 crores, out of gross margin of Rs. 208 crores,. It clearly indicates transfer of Rs.114 crores to free reserves surprisingly the SAIL deliberately allowed the gross margin become net loss in 1983-84, because it had transferred Rs. 160 crores to free reserves. The policy had to be dispensed with if erosion of equity is to be checked.

The Research Scholar's contention that free reserves are used by management of SAIL for window dressing, the cost of borrowed capital is vindicated by the facts presented in Table - 6. If one goes by the amount of interest payment as given in the B.P.E's report, it would be easy t

see that the figures are highly deflated. For example, interest of Rs. 32 crores on loans of Rs. 2,260 crores constitutes the inimaginable low rate of interest of 1.4%.

TABLE - 6

ANALYSIS OF LOANS AND INTEREST

(Rs. in Crores)

Years	Loans	Interest	Rate of Return	Fair Rate of Interest	Interest	Free Serves used in payment of interes
1	2	3	4	5	6	7
1978-79	2260	32	1.4	8	172	140
1979-80	2493	76	3	8	188	112
1980-81	2854	121	4	8	224	103
1981-82	3774	130	3.9	7	240	110
1982-83	3299	239	7.2	12	381	142
1983-84	3505	320	9.1	13	462	142

SOURCE : Compiled and worked out by Research Scholar from various year's Government's reports (B.P.E's)

If the amount of free reserves which the Research Scholar has determined with the help of cross references of various Tables of B.P.E's is added, it becomes a fair rate of interest for its loan in 1978-79 viz. 8%. In my opinion the SAIL had

paid interest of Rs. 172 crores, Rs. 32 crores as shown in B.P.E. report and Rs. 140 crores out of free reserves. The amount of free reserves so used varied from Rs. 103 crores in 1980-81 to Rs.142 crores in 1983-84. My objection of this policy is based on acceptable commercial norms to strictly restrain the management of the SAIL from using the depreciation reserve for meeting the cost of loans. The loans at its cost must be financial obligation of the Public Concerned itself which must be met by generating more profit through higher productivity.

Plant-wise analysis of working results has been presented in Table - 7. The table - 7 shows that Durgapur is the major plant which has accummulated loss of 138.78 crores during a period of five years. The plant has incurred heavy losses in the year 1983-84 viz. 63.72 crores and smallest loss in 1980-81 of Rs. 8.44 crores. Rourkela takes the second place in respect of the cumulative losses which stood at Rs. 113.69 crores over the period under review. The year-wise analysis is marked by two separate trends in the plants working result, a profit of Rs. 61 crores during 1979 and 1981. The gains of initial two years was more than off-set by the losses in the last two years which amounted to Rs. 175 crores. The Alloy Steel Plant incurred cumulated losses of Rs. 57.71 crores during the five years

TABLE - 7

PLANT-WISE ANALYSIS OF WORKING RESULTS

(Rs. in Crores)

Name of Units	Cumulative Profit/Loss	WORKING RESULTS 1979-80	1980-81	1981-82	1982-83	1983-84
Rourkela	(-) 113.69	47.65	13.97	NA	(-) 74.99	(-) 111.32
Bhilai	74.49	39.53	17.84	NA	19.95	- 1.83
Durgapur	(-) 138.78	(-) 22.39	(-) 8.44	NA	(-) 44.23	(-) 63.72
Bokaro	(-) 32.81	(-) 34.15	(-) 17.30	NA	18.09	1.53
ASP	(-) 57.71	(-) 0.14	(-) 4.51	NA	(-) 15.31	(-) 13.71
Salem	(-) 32.29	NA	NA	NA	(-) 14.21	(-) 13.08
Central Offices Coal Washeries	11.24	0.59	(-) 0.60	NA	4.93	6.32

SOURCE : Worked out by Research Scholar from B.P.E's Report 1983-84.

period (1979-84). It suffered heaviest loss in 1983-84 viz. 33.75 crores. Bokaro also did not fare well. In the initial two years it suffered losses of Rs. 52 crores and earned profit of Rs. 19 crores in the subsequent two years. It was left with the cumulative loss of Rs. 33 crores. The youngest plant at Salem, in the two years, 1982 and 1984, accumulated losses of Rs. 32 crores. The only activity of SAIL which is profitable is the coal washeries. They made consistent profit to the tune of Rs. 11.24 crores, except 1980-81 when a loss of Rs. 60 lakhs was incurred.

Research Scholar is apprehensive of the impact of over financial performance of SAIL. The total investment of Rs. 5,719 crores in SAIL is apt to be totally wiped out by the persistent losses in twenty years at the current rate. This can be averted if the central government allows the SAIL amortization of the loans. The financial statement of all the years clearly indicates SAIL's losses resulting from the excessive payments of interest. The suggestion is in conformity with the social objectives which the Corporation is obligedto fulfil viz. supply of cheap steel for industrialisation, generation of more employment development of ancillary industries, development of backward areas

etc. The SAIL has invested quite a substantial amount of capital in township for its employees (the subject-matter is discussed in depth in the subsequent paragraphs) Capitalisation of loan whould release funds most needed by the Corporation for expansion and modernisation.

To a large extent, the losses also result from lack of dynamic marketing strategies. The production target which is set by the planning Commission is usually on the low side. As a matter of fact, lower target for fulfilment act as a grip on higher productivity. The financial implication also flow from it, the unit cost which incorporates the overheads trend to move up without any corresponding upward revision in the price. The observation by the Research Scholar is based on the working results, presented in Table - 7. The four major Steel Plants of SAIL (Rourkela, Bhilai, Durgapur and Bokaro) are the ones saddled with heaviest losses mainly due to the higher unit cost. 70% of the unit cost consists of raw material (40%) labour (40%), capital (5%) Power (10%) and overheads (5%). The major area of economy drive must be in the direction of realising technical and marketing economies.

The matter of highest priority for consideration by authorities is the pricing policy of the Government. The value of the Sales/gross income has not risen in direct

proportion to physical production. The following Table - 8 contains the price and cost indices for a period of 17 years (1967 being the base year). The Steel prices increase much less than the cost of production till 1972.

TABLE - 8

PRICE AND COST INDICES (1967 = 100)

Years	1967	1972	1977	1982	1984
Steel Price Index	100	171	835	1227	1257
Steel Cost Index	100	205	815	1197	1242

SOURCE : Compiled and computed by Research Scholar from B.P.E's reports, 1982-83, 1983-84, 1984-85, R.B.I. Bulletin August, 1979, Nov.1980, March,1982.

The policy of the government has been for supply of cheap steel for further industrialisation, while the cost of producing a tonne of steel rose to 205 points; the price which is administered by the Government to only 171 points, leaving a gap of 34% between selling price and unit cost of production. As a result of it, the SAIL incurred loss of Rs. 45.6 crores. However, the pricing policy was changed in only 1977 to revise price upward in tune with the rising

cost following the hike in coal price, freight and power charges. The SAIL was also able to economise its cost by using the plant more effectively, reducing the level of inventories and normalising its industrial relations. The cumulative effect of improved productivity and new pricing policy of government can be seen in better unit price in 1977. The policy continues only till 1982. With Salem as a new plant, the average cost of production was less than the selling price again in 1984. The government did not raise the price as much as the increase in the cost. The SAIL incurred loss in 1984. The price and cost indices amply prove that administered prices are serving as a severe constraint on income generating capacity of SAIL.

The Table - 9 presents a profitability ratio of SAIL during the period 1980-81 to 1983-84. The profitability ratio gives an overall view of financial efficiency of an enterprise. The positive profitability ratio is the outcome of efficiency in material management, economy in operating expenses; in fuel,Power salary wages and maintenance. The table shows that ratios in the last two years i.e. 1982-83 and 1983-84 are a negative; as gross profit to total capital employed (-) 1.2 and(-) 1.0 as gross profit to net sales (-) 2.6 in only 1982-83 and net profit to net worth, (-) 6.5 and

(-)3.2 respectively. Ratios for other preceding years are positive but they are much lower than that of profitibility of MISCO in private sector its ratios were 11.7 and 11.99 in 1980-81 and 1981-82 respectively as gross profit to capital employed. The ratios of gross profit to net sales were 12.57 and 14.16 in 1980-81 and 1981-82 and the ratios of net profit to net worth were 10.29 and 17.66 in 1980-81 and 1981-82 respectively. It can be inferred that private Steel Plant is more efficient than public sector steel plants are the result of frequent price hike which uitimately discouraged cost reducing effort of management.

TABLE - 9

PROFITABILITY RATIO (SAIL))

Ratio.	1980-81	1981-82	1982-83	1983-84
1. Gross Profit as percentage of total capital employed.	2.98	3.50	(-) 1.2	(-) 1.0
2. Gross Profit as percentage of net sales	8.60	9.24	(-) 2.6	3.0
3. Net Profit as Percentage of net worth	1.21	2.34	(-) 6.5	(-) 3.2

SOURCE : The Economic Times January 25,1984.

Physical Performance :-

To measure social return from investment in Steel Industry, the Research Scholar has estimated the physical performance to examine as to whether the social capital is used by the industry efficiently.

Table - 10 presents production of Steel during 1980-81 and 1984-85. With the actual production of Saleable Steel by the five integrated Steel plants of SAIL and TISCO totalling 4.8 M.T. during the first three quarters of 1984-85, the targetted output of 7.09 M.T. set for the year is well within reach. The last quarter of 1984-85 has shown enhanced performance to fulfil the target, as compared 2.0 M.T. produced in the corresponding quarters of 1983-84.

Table - 11 shows plant wise production of hot metal during the years 1980-81 and 1983-84. It manifests that the average annual production for the period under review was 9.7% higher than that for the period 1970-1980. Average annual production of ingot Steel for 1980-83 as presented in Table - 12 has been up by 13% over the average production for 1970-80. However, increase in the production of SAIL has been 14.5% and that of TISCO 11.5% on average over the same period. In 1982-83 production of ingot steel both in SAIL AND TISCO has declined by 0.5% and 0.51% respectively over that of 1981-82.

TABLE - 10

PRODUCTION OF STEEL BY SAIL AND TISCO

(M.Ts.)

Years	Steel Ingots.		Saleable Steel		Total for SAIL & TISCO	
	SAIL	TISCO	SAIL	TISCO	Steel Ingots	Sale-able Steel.
1971-72	4.9	1.71	3.10	1.39	5.80	4.49
1972-73	4.44	1.69	3.34	1.46	6.13	4.80
1973-74	4.21	1.51	3.15	1.20	5.72	4.35
1974-75	4.54	1.72	3.44	1.46	6.26	4.90
1975-76	5.46	1.79	4.32	1.49	7.25	5.81
1976-77	6.52	1.91	5.43	1.55	8.43	6.98
1977-78	6.46	1.97	5.29	1.60	8.43	6.89
1978-79	6.29	1.87	5.08	1.52	8.16	6.60
1979-80	6.25	1.78	4.63	1.45	8.03	6.08
1980-81	6.10	1.87	4.77	1.54	7.35	6.31
1981-82	6.44	1.96	5.65	1.61	8.60	7.26
1982-83	6.68	1.95	5.67	1.62	8.63	7.29
1983-84	6.96	1.97	4.77	1.63	8.93	6.40
1984-85 (+)	6.0	-	5.44	1.65	-	7.09
1984-85 (*)	4.71	1.96	3.61	1.22	6.40	4.83
(April, Dec. 1983-84 (April-Dec	4.23	1.40	3.24	1.16	5.63	4.40

SOURCE : The Economic Trend for various years.

TABLE - 11

PLANTWISE PRODUCTION OF STEEL MAIN PRODUCERS

(Rate of Growth in percentage) '000 Tonnes

Hot Metal	Annual 1970-71, 1979-80 Average	1980-81	1981-82	Percentage Growth	1982-83	Percentage Growth	1982-83 Aprl.	1983-84 Dec.	Percentage Growth	1983-84 Aprl Mar
Bhilai	2672	2214	2377	7.23	2330	1.97	1502	1717	14.31	2200
Durgapur	1010	821	1023	24.60	1056	3.22	720	781	8.47	1060
Rourkela	1245	1227	1336	8.9	1203	9.95	824	888	7.47	1120
Bokaro	1213	(@)1678	2192	30.63	2194	0.91	1578	1597	1.20	2275
IISCO	829	788	800	1.52	912	0.14	600	645	7.5	888
Total SAIL	6670	6728	7728	14.86	7695	0.43	5224	5628	7.73	7543
TISCO	1644	1648	1774	7.65	1793	1.07	1241	1318	6.20	1840
Total SAIL and TISCO	8314	8376	9502	13.44	9488	(-)0.15	6465	6946	7.44	9383

Note : @Annual Average for 8 years.

SOURCE : The Economic Times "Steel Industry Supplement"
25th, January, 1984.
% growth has been calculated by the Research Scholar.

TABLE - 12

PLANTWISE PRODUCTION OF STEEL MAIN PRODUCERS

(Rate of growth in percentage) '000 Tonnes.

INGOT STEEL	1970-71, 1979-80 Annual Average	1980-81	1981-82	Percentage Growth	1982-83	Percentage Growth	1983-84 1982-83 Apr.	Dec.	Percentage Growth	1983-84 Apr-March Revised
Bhilai	2109	2041	2115	3.63	2130	0.71	1312	1568	19.51	1800
Durgapur	866	741	930	25.50	952	1.94	592	698	17.90	850
Rourkela	1197	1165	1203	3.26	1144	4.9	976	837	7.9	1064
Bokaro	713(b)	923	1792	94.15	1829	2.08	1196	1316	10.03	1650
TISCO	579	609	600	1.5	624		383	433	13.05	628
TotalTSAIL	5464	5479	6640	21.19	6679	0.59	4232	4852	14.65	5992
TISCO	1766	1874	1956	4.38	1946	0.51	1396	1437	2.94	1940
Total SAIL and TISCO	7230	7353	8596	16.90	8625	0.34	5628	6289	11.74	7932
	1205	1226	1433		1438		938	1048		

Note : (b) Annual Average for 7 years.

SOURCE : As Table No. 10.

As regards production of saleable steel, Table - 13 shows an increase of 15% on average during 1980-83, over that of 1970-80. Increase in the case of SAIL and TISCO was of the order of 22% and 8% respectively during the period under review. However, Rourkela steel plant of SAIL has suffered a set back in the production of saleable steel to the extent of 9.07% in 1982-83.

The five integrated Steel plants under SAIL at Bhilai, Bokaro, Durgapur, Burnpur, and Rourkela registered 17%[1] in production of saleable steel during April-October 1985 as compared to the previous corresponding period.

In case of hot metal productiom there has been a growth of 22%[2] during the month under review as compared with the production in October, 1984. Salem Steel Plant produced 130.90[3] tonnes of saleable steel during the period April-October, 1985 as against 8760 tonnes during the corresponding period of last year, registering a growth of 49%[4]. This exceeded the target for the period by 13%.

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1. The Economic Times 5th November, 1985.
2. Ibid.
3. Ibid.
4. Ibid

TABLE - 13

PRODUCTION OF SALEABLE STEEL - MAIN PRODUCERS

(Rate of Growth in Percentage) '000 Tonnes.

Saleable Steel	1970-71 to 79-80 Annual-Average	1980-81	1981-82	Percentage Growth	1982-83	Percentage Growth	1982-83 Apr. Dec.	1983-84	Percentage Growth	1983-84 Apr. March
Bhilai	1759	1818	1819	0.06	1818	1.04	1330 1088	1088	(-)18.19	1460
Durgapur	612	598	782	30.76	812	3.84	601	403	(-)32.95	658
Rourkela	907	985	1091	10.76	992	(-)9.07	693	567	(-)18.18	838
Bokaro	580	844	1471	74.29	1529	3.94	1111	871	(-)21.60	1275
IISCO	549	523	488	6.70	499	2.25	351	312	11.11	500
Total SAIL	4317	4746*	5553*	17.00	5605*	.94	4086	3241	(-)20.7	4731
TISCO	1448	1537	1537	4.55	1621	.87	1183	1157	(-) 2.19	1550
TOTAL SAIL AND TISCO	5765	6283	6283	13.96	7226	.92	5269	4398	16.53	6281

Note :- *Exclude inter-plant transfer.

SOURCE : The Economic Times "Supplement on "Steel Industry" dated 25th January, 1984

The rate of growth in % age has been calculated by the author.

The SAIL group sold 4,54,000 tonnes of Steel from domestic production during October, 1985 as against 3,87,100[5] tonnes in October, 1984 registering a growth of 17%[6]. This was 11% higher than the sale of steel has been of the order of 2.7 M.T. as against 2.6 M.T. during April-October,[7], 1985 as in the previous corresponding period production performance of integrated steel plants would have been far better, had there been efficient utilisation of capacity. It is regarded as a "optimum" performance in steel industry, if the hot metal output exceeds 90% of the rated capacity without any increase in inventory levels."

It is evident from the Table - 14 that none of the major producers of steel in India were able to reach the "optimum" level of utilisation of capacity during 1970-71 to 1979-80 and 1981-82. Of course, TISCO has almost operated to full capacity with an average of 89.2% over the period under review. The SAIL's average utilisation of capacity has been only 76%. Average rate of capacity utilisation during the first eleven years has been 85% which declined to 72% in subsequent years.

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5. Ibid
6. Ibid
7. Ibid

TABLE - 14

HOT METAL CAPACITY UTILISATION

(Production as percentage to rated capacity)

	Bhilai	Durgapur	Rourkela	IISCO	TISCO	BOKaro	SAIL 100
Rated Output	10000	100.0	100.0	100.0	100.0	100.0	85%
1959-60	91.9	16.8	62.5	82.3	83.7	NA	64%
1960-61	82.7	59.3	58.2	89.3	83.5	NA	72%
1961-62	85.9	100.3	60.0	91.3	86.6	NA	89%
1962-63	100.1	104.5	72.9	99.4	92.8	NA	94%
1963-64	109.81	122.8	78.2	95.2	95.2	NA	102%
1964-65	99.5	123.9	93.0	89.5	99.2	NA	102%
1965-66	91.7	120.7	99.4	93.7	101.0	NA	101%
1966-67	109.2	65.4	68.2	90.5	101.4	NA	83%
1967-68	88.1	59.9	58.5	83.8	90.9	NA	73%
1968-69	81.9	71.7	77.7	88.2	90.4	NA	80%
1969-70	82.3	72.9	74.2	84.6	85.6	NA	79.%
1970-71	-	-	-	-	-	-	-
1971-72	91.2	60.7	71.6	71.5	87.6	NA	74%
1972-73	77.8	60.0	60.6	70.0	86.0	NA	67%
1973-74	78.4	61.0	77.6	53.8	88.5	NA	68%
1974-75	75.6	57.6	75.1	58.6	87.8	NA	66%

Contd...

	Bhilai	Durgapur	Rourkela	IISCO	TISCO	Bokaro	SAIL 100
1975-76	-	-	-	-	-	-	-
1976-77	81.2	64.2	86.3	70.5	86.9	NA	76%
1977-78	94.1	76.3	91.3	72.3	92.4	NA	83%
1978-79	90.8	70.9	82.8	69.8	92.7	NA	79%
1979-80	84.8	61.9	82.8	66.0	88.0	80.0	75%
1980-81	75.4	57.8	78.2	59.1	79.9	61.9	65%
1981-82	74.5	48.2	76.7	60.6	86.7	61.4	64%
TOTAL :	87.2	72.2	73.4	80.8	89.2	68.8	76%

SOURCE : Capacity is calculated by taking into account the commissioning dates assuming that full capacity of a furnace would be realised in three years. Production data is taken from the Steel Ministry's Annual Reports and operational statistics of the Public Sector Plants for various years. The figures refer to the production of the plants as a percentage of the rated capacity officially announced, as quoted by S.S.Sidhu, "The Steel Industry in India," P. 55.

Table - 15 presents almost the similar picture of utilisation of capacity of ingot steel during the period 1975-76 to 1984-85. Production of ingot steel has not been "optimum" during the period under review. Combined production of ingot steel by SAIL and TISCO for the same period was 83% of the rated capacity. However, TISCO's performance in respect of utilisation of ingot capacity has been optimum because it has utilised 99% of its ingot capacity, while, on the other hand, SAIL has lagged behind the optimum level of capacity with 72%. Centpercent utilisation of capacity in TISCO is the result of meticulous planning and a well-drawn-out rejuvenation maintenance and revamping programmes.

Table - 16 displays excellent performance of TISCO in the production of saleable steel during the period under review. On the contrary SAIL's performance was below the optimum having utilised 76% of the saleable steel capacity. Average annual rate of production of saleable steel for both the SAIL and TISCO has come to 87%.

Table - 17 shows utilisation of capacity of saleable steel in relation to the installed capacity and actuals of production. The production of SAIL (including TISCO) was 5.672 M.Ts. achieving on average rate of 79% of capacity

TABLE - 15

CAPACITY UTILISATION OF STEEL PLANTS (INGOT STEEL PERCENTAGE)

Ingot Steel	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	Average % rate
Bhilai	88	92	95	88	84	82	85	85	73	63	70*
Durgapur	63	68	68	59	55	46	58	60	50	44	48*
Rourkela	71	81	78	73	70	65	67	64	60	47	58
Bokaro	-	-	-	70	57	37	72	73	67	53	74*
TISCO	63	67	65	63	57	61	60	62	54	43	39
TOTAL SAIL	74	81	80*	73	67	58	71	71	63	63	72
TISCO	89	95	98	93	89	94	98	97	99	92	99
TOTAL SAID & TISCO	78	84	84*	77	70	65	75	76	70	68	83

NOTE : *Excluding BSC under erection gestation.
*b Includes production of SAILS -2 in the trials period.

SOURCE : "The Economic Times, 25th Jan. 1984, Supplement Steel Industry" Data for the years 1983-84 and 1984-85 has been updated with Annual Reports of Ministry of Steel, Mines & Coal, 1984-85.

TABLE - 16

CAPACITY UTILISATION OF STEEL PLANTS
SALEABLE STEEL (PERCENTAGE)

Saleable Steel	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	Average
Bhilai	95	103	98	94	87	-	93	93	94	[illegible]	[illegible]
Durgapur	61	73	70	63	49	-	48	63	66	[illegible]	[illegible]
Rourkela	88	96	96	85	85	-	80	89	81	[illegible]	[illegible]
Bokaro	-	-	-	69	43	-	43	75	78	[illegible]	[illegible]
TISCO	63	68	63	80	54	-	65	61	63	[illegible]	[illegible]
Total SAIL :	79	89	86*	77	64	-	66	79	79	[illegible]	[illegible]
TISCO	99	103	107	101	97	-	103	107	106	[illegible]	[illegible]
TOTAL SAID AND TISCO	84	92	90	82	69	-	72	83	84	[illegible]	[illegible]

NOTE : *Excluding BSC under erection gestation.

@With respect to 2.5 M.T.Stage only at BSP(Bhilai Steel Plant).

SOURCE : "The Economic Times, 25th Jan.1984, Supplement Steel Industry.
Data from 1983-84, updated with Economic Trend 16,Aug.1985, P. 29.

TABLE - 17

CAPACITY AND PRODUCTION OF SALEABLE STEEL SAIL PLANTS
1982-83 to 1985-86 (April-June)

Item/ Plant	Installed Capacity	1982-83 Actuals	% of Capacity Utilisation	1983-84 Actuals	% of Capacity Utilisation	1984-85 Actuals	% of Capacity Utilisation	Plan	%age	Installed capacity	Target	Act	%age
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Saleable Steel													
B S P	1965	1838	94	1574	80	1810	90 @	2040	89 @	422	408	94	76 @
D S P	1239	813	66	602	49	621	50	720	58	128	153	119	49
R S P	1225	992	81	862	70	1013	83	1000	82	175	104	59	34
B S P	1971	1529	78	1288	65	1459	74	1720	87	386	296	77	60
IISCO	800	500	63	444	55	380	48	480	60	99	119	121	60
SAIL	7200	5672	79	4771	66	5283	73 @	5960	77 @	1210	1080	89	58 @

@ With respect to 2.5 M.T. stage only at B S P (Bhilai Steel Plant)

SOURCE : The Economic Trend of various years.

TABLE - 18

PLANT CAPACITY IN 1979-80

Name of the Plant	Iron Making (Hot Metal)	Steel Making	Products
1. Bokaro	3 B.F.	4 L.D. 100 T	Blooms, Slabs, Strip, Billets Plates, Sheets
2. Durgapur	3 B.F. 1171 cbM	8 OHF-220T	Blooms, Slabs, Sleepers
	1 B.F. 1550 cbM	1 OHF-120T	Bars, Merchant, Products, Skelp, Wheels and Axles Section
3. TISCO	3 B.F. 550 cbM	3 Bessmers	Section
	2 B.F. 1140 cbM	6 OHF	Black, and galvanised sheets.
4. TISCO	1 B.F. 558 cbM	150 HF 190 T	Rails, Bars and Structural
	2 B.F. 633 cbM	20 HF 250 T	Plates, Sheets, Strips
	2 B.F. 939 cbM	SLD- 25 T	Wheels, Axles, Tyres
	1. B.F. 1337 cbM	2 EAF	
5. Rourkela	3 B.F. 1033 cbM	4 OHF 800 T	Slabs, Plates, Cold Hot
	1 B.F. 1660 cbM	3 LD4050 T	Coil Sheets, Sect. Coils
		2 LD 60 T	Stripes, Tapes
6. Bhilai	3. B.F.1033 cbM	50 OHF 250T	Blooms, Billets, Rails
	2 B.F. 1719 cbM	50 HF 500T	Structurals and squares, Wire rods
7. VISL	2 EAF (Pig)100 T	20 HF 25T	Blooms, Bars
	2 EF (Iron)	2 LD IST	Sheets, Foggings
		200 T	3 ELF Arc

SOURCE : Sidhu, S.S. "The Steel Industry in India". Problems & Prospective" P.P.33.

utilisation. The main constraints in achieving higher capacity utilisation during that year were severe power restrictions imposed by the public utilities on the Steel plants.

It is worth noting that public steel plants have larger installed capacity than TISCO. It may be observed that integrated steel plants which possess larger capacity have not operated at the optimum level and that they have lagged behind TISCO. It may be partly accounted by different product mix and partly by different sizes and ore-charges of blast furnace.

In fact, blast furnaces of steel plants display a wide variation in the size-distribution. Table - 19 shows that of 27 B.F. that are in operation at Bokaro, Durgapur, IISCO, Rourkela, Bhilai, VISL and TISCO, eight blast furnaces have the capacity between 500-1000 Cbm working volume, twelve have the working volume between 1000-1500 Cbm and seven are of 1500-2000 Cb M working volume.

Plant-wise distribution of blast furnaces reveal that Bokaro possess 3 B.F., each of 1500-2000 CbM working Volume. Durgapur Steel Plant has four blast furnaces three of 1000-1500. CbM working volume and one of 1500-2000 CbM working

volume. IISCO operates five blast furnaces, three having capacity between 500-1000 and two between 1000-1500 Cb M working Volume. TISCO has six blast furnaces five of the capacity ranging between 500-1000 cb M working Volume and o one of the capacity between 1000-1500 cbM. Rourkela holds four blast furnaces-three of the size of 1000-1500 and one that of 1500-2000 cbM working volume. Bhilai has got 5 B.F., 3 of the size of 1000-1500 and 2 of 1500-2000 cbM working Volume.

The facts cited above reveal two distinct characteristics of the capacity of blast furnaces. In the first place, there is wide diversity in the size of blast furnaces. Secondly, public steel plants have opted larger capacities of blast furnaces.

Although all the integrated steel plants are equipped with larger capacities, sintering facilities are lacking in some of them and most of them do not have even bedding and blending facilities. Therefore, steel plants use lumps, in place of sinter, regardless of its adverse effects on their productivity.

The other factors on which productivity of steel plants depends include higher blast temperature and top pressure controlling arrangements. In the production of finished

steel, energy consumption is an indicator of steel plants efficiency. There is a marked tendency world over towards the reduction in coke use. The oxygen converters have given birth to a new process in steel-making with a minimum level of 450 Kg. of coke consumption per tonne of steel. Table-20 presents the data pertaining to coke consumption per tonne of hot metal in Indian Steel Plants during 1966-67 and 1976-77. Declining trend is percetible in the use of coke.

The chief causefor the reduction of coke use has been an increase in demand for steel and the innovations in the steel making. During the period under review, though a substantial reduction in coke use was attained, the decline in total energy consumption per tonne of iron has been marginal, as the total energy used in making Iron approached the theoritical minimum, that is aroung 450 kg. The decrease in coke consumption should be interpreted more as a decline in the wastage of energy in the B.F. made possible through a better burden preparation, higher blast temperatures and auxiliary fuel injections and better energy of utilisation in large furnaces.

The basic energy inputs in integrated Steel plants comprises 77-85% coking coal, 8-19% non-coking coal, 8% petroleum fuel and 1 to 3% purchased electrical power.

Specific energy consumption for SAIL's plants taken together in crude/ingot steel as per present international practice, is twice the values approx. for advanced countries like Japan, Bhilai Steel Plant has the lowest value of 8 Giya colaries per tonne of ingot steel. IISCO has the highest value at 13 Giya colaries per tonne of ingot steel, while the steel plants in Japan consume energy inputs at the value of 5 Gigacolaries per tonne.

The main reasons for the higher rate of energy consumption are :-

(a) High coke rate owing to higher ash of 19.21% coking coal as charged to coke over while abroad the coke rate ranges between 8 to 10%.

(b) Inadequate sinter usage and absence of ore bedding and average sizing facilities also lack of other modern facilities at blast furnaces.

(c) Producing Ingot Steel at higher proportion (about 65%) by energy intensive open hearth process.

(d) Want of concast facilities for production of blooms/Slabs/Billets.

However, as stated earlier poor quality of coking coal and inveterate problems of its scarce supplies have caused grave impediments in the realisation of steel production

TABLE - 19

BLAST FURNACE CAPACITY

Plants/ Classes	500-1000 No. of B.Fs.	1000-1500 No. of B.Fs	1500-2000 No. of B.Fs
1. Bokaro	-	-	3
2. Durgapur	-	3	1
3. IISCO	3	2	-
4. TISCO	5	1	-
5. Rourkela	-	3	1
6. Bhilai	-	3	2
T O T A L :	8	12	7

SOURCE : Compiled by Research Scholar from Table No. 18

targets. The coal pushing has been precariously low during the last few years resulting in huge loss in production.

Apart from the scarce availability of coking coal, the steel industry has to use coal with 28% of dust content as against the safe limit of 16%. The deteriorating quality of coal with maximum ash content may be attributed to deeper mining system.

TABLE - 20

COKE CONSUMPTION IN Kg. PER TONNE OF HOT METAL OF INDIAN STEEL PLANTS

	Bhilai	Rourkela	Durgapur	IISCO	TISCO	Bokaro (Wet Coke)
1966-67	792	936	925	941	823	-
1967-68	839	963	913	946	868	-
1968-69	845	962	905	1015	877	-
1970-71	810	901	930	981	934	-
1971-72	810	928	949	986	921	-
1972-73	808	NA	NA	1087	NA	-
1973-74	800	952	945	1146	NA	-
1974-75	779	925	1005	1065	NA	752
1975-76	794	934	1002	1029	893	698
1976-77	792	919	872	1063	839	700

SOURCE : Operation Statistics of plants for various years.

TABLE - 21 (A)

ENERGY CONSUMPTION DATA IN STEEL SECTOR
(1983-84)

Sl. No.	Items	Unit	BSP	DSP	RSP	BSL	TISCO	SAIL/TOTAL Average
1	2.	3	4	5	6	7	8	9
1.	Coke Coal (dry)	X 106 t	2.944	1.472	1.681	3.497	1.650	11.24
2.	Steam Coal	X 106 t	0.516	0.260	0.241	0.743	0.495	2.21
3.	Petroleum Fuel	X 103 t	9.99	98.53	94.47	6.02	22.60	231.61
4.	Purchased electricity	X 106 MWH	0.632	0.293	0.518	0.810	0.128	2.381
5.	Total energy output	X 106	22.15	11.51	13.32	26.87	13.26	87.11
6.	Specific Energy Consumption							
6.1	Hot Metal Stage	G.Cal/t	7.33	7.11	7.27	6.07	9.7	7.45
6.2	Ingot Steel Stage	G.Cal/t	7.30	9.36	7.77	7.07	82.39	8.05
6.3	Saleable Steel Stage	G.Cal/t83-84	10.37	12.81	13.13	11.95	15.63	12.09
		G.Cal/t82-83	10.00	12.44	13.48	11.75	15.36	11.84
		G.Cal/t81-82	10.19	12.15	12.51	11.97	16.39	11.90

SOURCE : Public Enterprises Survey, BPE, Ministry of Finance, Government of India, New Delhi, 1983-84, P. 276.

TABLE - 21

SUPPLY OF COAL TO STEEL PLANTS

(Unit in M.T.)

Year	Demand	Supply	Shortfall
1972-73	14.18	11.42	2.76
1973-74	14.74	11.30	3.44
1974-75	13.36	11.45	1.91
1976-77	14.66	14.11	0.55
1977-78	15.96	14.92	1.04
1978-79	9.47	8.05	1.42

SOURCE : 30th Report of Sixth Lok Sabha of C.P.U. on SAIL 1978-79.

Table - 21 indicates that steel demand of steel plants for coal has not been fully met during 1972-73 and 1978-79 (April-October). The shortfall ranged from 2.76 M.T. in 1972-73 to 1.42 M.T. in 1978-79. The Steel plants still have to produce less than the rated capacity because of shortfall in the supply of coal.

Refractories have also been in short supply. The supply of finished refractories to steel plants has showed downward trend because there are not enough Railway Wagons. The Refractories units are also facing the problem of inadequate

raw materials. The problems have been accentuated by the railways insistence that refractories be moved in rake loads while this may be feasible for the movement of bulk commidities but not for finished refractories.

The Steel plants in India have been suffering varying degrees of set-backs in steel production. The noticeable reasons are paucity of power supply and lower temperature in the blast furnaces. The highest blast-furnace temperature attained at public sector was about 900^{oC}, while temperature attained and maintained abroad ranges between 1250^{oC} to $1400^{o}C$. Hence, the inadequate power supply causing lower attainment of temperature in B.F. could be attributed to one single cause responsible for low utilisation of capacity. Apart from the fact, frequent fluctuation of voltage at times, cause damage to many sensitive equipments of the steel plants. Improper maintenance of B.F., plants and equipments also underlay the gap between actual and potential production of steel.

Problems of maintenance of the B.Fs is the result of wide variation in the size, viz. 500 to 2000 units of working Volume. It is difficult to establish facilities to produce spare parts that differ in specification widely. The market supply of spare parts for each furnace would be small. This is the compelling reason for high level of inventory even of

those parts that are most unlikely to be used. High level of imported inventories have pushed up the inventory cost of Indian B.Fs. If the B.Fs cannot be maintained properly, the size of furnace is of no-economic advantage.

Negligence and misuse is also responsible for lack of proper maintenance of the machine. It underlines the need for proper training of workers at plant level, which is not adequate at present. Durgapur, Rourkela and Bhilai steel plants often have loss of hours of production due to breakdowns. The inadequate maintenance of machines is responsible for frequent breakdowns. It is imperative to ensure smooth operation of the plants at maximum efficiency.

Efficiency of the plant also depends on the efficiency of labour. Public Steel plants are known for excessive labour force.

Table - 22 given below furnishes glimpse of the aggregage employment of workers and non-workers in the Indian Steel Plants as on March 31, 1981.

TABLE - 22

EMPLOYMENT IN STEEL PLANTS AS ON 31st March, 1981

	Bhilai	Durgapur	Rourkela	TISCO	IISCO	Bokaro	VISL	ASP
Total Employment	22191	33004	36852	40042	22051	40453	16681	7284
Total Workers	48436	30882	30882	39324	21041	39324	10139	6442

SOURCE : Data Stand Book P. 137, as quoted in Sidhu, S.S. The Steel Industries in India, Problems & Prospective P.63.

The aggregate employment in the Steel plants exceeds 0.251 millions. The works employment including mines is 0.164 millions. These employment levels are far in excess of project estimates. The project report with the exception of Durgapur gives detailed estimates of the man power needs of the plants, in terms of skilled/unskilled labour, taking into account, sickness, absentism and other allied factors. For Bhilair Steel Plants, a detail projection was framed to specify man power needs both for recruitment as well as for determination of training recruitments.

It is said that large labour force were employed by Hindustan Steel Ltd. at the time of construction of three public sector steel plants. Another version regarding the heavy absorption of labour force is attached to pressure from the Government. Another reason for high level of employment in Steel Industry has been inefficient man power, recruitment and planning (technical, skilled/unskilled and administrative). Excess labour force level depresses the labour productivity even though target output is attained.

Industrial relations play a crucial role in enhancing productivity of Steel undertaking. It has been noticed that industrial relations in steel plants have been quite uneasy which have adversely affected the utilisation of capacity.

Organisational set up also bears on the utilisation of capacity. There is also the need of devolution of authority to the plants which has fortunately been recognised by the Government. Powers governing the hiring and promotion of employees and expenditure have been subsequently delegated to the plant management. But at the same time, it is equally necessary that there is devolution of authority from the plant top management so long as authority is not delegated down the line, the demoralisation of the plants personnel could continue to persist. The strained industrial relations are the outcome of the lack of man power planning.

The public sector Steel plants were over burdened with unduly large inventories and inefficient management. The Table-23 provides an insight into the inventories, which stood at 796.600 tonnes on 1 April, 1980 and were reduced to 726,7000 tonnes in the following years. The main factors responsible for success in bringing down the inventories was restricted import of steel. The SAIL was also unable to find market for its steel. The demand was sluggish. Hence the SAIL was forced to cut down production and steel imports with effect from Ist August 1983. As a consequence, the inventories dropped down to 1214.3000 Tonnes in January, 1984.

TABLE - 23

STOCK OF STEEL WITH MAIN PRODUCERS

('000 Tonnes')

	Plants	Stock Goods	Imports	Total
1 x 4 x 1980	267.1	290.9	238.6	796.6
1 x 4 x 1981	432.1	224.6	70.0	726.7
1 x 4 x 1982	406.2	739.8	31.4	1177.4
1 x 4 x 1983	454.2	1078.3	102.6	1635.1
1 x 5 x 1983	376.6	1186.7	98.8	1662.1
1 x 6 x 1983	370.3	1157.8	101.1	1629.2
1 x 7 x 1983	312.4	1110.6	105.8	1528.8
1 x 8 x 1983	304.9	1074.9	98.4	1478.2
1 x 9 x 1983	333.6	1042.6	95.2	1471.4
1 x10 x 1983	337.6	997.4	92.8	1427.8
1 x11 x 1983	341.5	969.8	88.0	1399.3
1 x12 x 1983	351.4	927.9	76.5	1355.8
1 x1 x 1984	360.2	776.1	69.0	1214.3

SOURCE : B.P.E's Report 1983-84

TABLE - 24

SIZE OF INVENTORY IN IRON & STEEL INDUSTRY IN INDIA

(Rs. in crores)

Years	Industry as a whole	TISCO	SAIL
1973-74	475.89 (62.65)	67.36 (62.51)	408.53 (62.68)
1974-75	616.19 (60.34)	93.84 (59.67)	522.35 (60.46)
1975-76	828.98 (71.27)	112.49 (70.48)	716.49 (71.39)
1976-77	837.11 (66.26)	109.14 (64.51)	737.99 (66.53)
1977-78	728.16 (69.47)	100.98 (62.68)	627.18 (71.31)
1978-79	880.64 (68.08)	110.62 (62.99)	270.02 (68.88)
1979-80	1189.00 (67.74)	142.19 (67.14)	1046.81 (67.82)
1980-81	1400.29 (68.10)	169.03 (66.04)	1231.26 (68.39)
1981-82	1840.16 (69.02)	229.89 (62.22)	1610.27 (70.10)
1982-83	2048.61 (69.12)	218.83 (60.35)	1829.78 (70.34)

SOURCE : Annual Reports of Iron & Steel Industry 1973-74 to 1982-83.

NOTES : Figures in brackets show percentage of inventories to current assets.

Table - 24 gives profile of the size of inventory in Iron & Steel Industry as a whole (including TISCO) during the period 1973-74 to 1982-83 with the perusal of the table, it is distinct that inventory is a major item of current assets in Iron & Steel Industry. The Inventory of Industry as a whole demonstrates fluctuating trend that is 62,65% in 1973-74 of the total current assets to 71.27% in 1975-76 and 69.12% in 1982-83. SAIL, in comparison with TISCO (in Private sector) has blocked a lion's share of percentage of inventories of the total current assets.

Table - 25 also shows a fluctuating trend in inventory turn-over ratio during the period uncer review. The Steel Industry as a whole has recorded the inventory turn-over ratio in the range of 1.48 times and 2.27 times in years 1975-76 and 1979-80 respectively. As against SAIL's inventory turn-over ratio, TISCO has fared well during the period under review. TISCO has inventory turn-over ratio in the range of 2.57 times in 1975-76 to 3.32 times in 1979-80 as against SAIL's 1.12 times in 1979-80 to 2.12 times in 1977-78. By and large TISCO has increasing trend while SAIL portrays a dismal show of efficiency in inventory management.

TABLE - 25

INVENTORY TURN-OVER RATIO OF IRON & STEEL INDUSTRY IN INDIA 1973-74 to 1982-83

(Figures in tonnes)

Year	Industry as a whole	TISCO	SAIL
1973-74	1.70	2.99	1.49
1974-75	1.77	3.08	1.55
1975-76	1.48	2.47	1.30
1976-77	1.77	2.74	1.63
1977-78	2.27	3.25	2.12
1978-79	2.19	3.29	2.02
1979-80	2.27	3.32	1.12
1980-81	1.98	2.93	1.85
1981-82	1.93	3.05	1.77
1982-83	2.01	3.19	1.36

SOURCE : Annual Reports of Iron & Steel Companies 1973-74 to 1982-83.

Table - 26 shows that inventory in Iron & Steel Industry as a whole has always transcended the amount of working capital from 1973-74 to 1982-83. It is distinct from the table that chunk of working capital funds was blocked in inventories throughout the period of study under review.

TABLE - 26

INVENTORY OF WORKING CAPITAL RATIO OF IRON & STEEL INDUSTRY 1973-74 to 1982-83

(Figures in Tonnes)

Years	Industry as a whole	TISCO	SAIL
1973-74	1.19	2.31	1.11
1974-75	1.12	1.85	1.31
1975-76	1.22	1.79	1.16
1976-77	1.11	1.61	1.06
1977-78	1.52	1.77	1,48
1978-79	1.77	2.50	1.70
1979-80	1.86	3.02	1.77
1980_81	1.79	3.96	1.66
1981-82	1.61	1.92	1.58
1982-83	1.55	2.06	1.50

SOURCE : Annual Reports of Iron & Steel Companies 1973-74 to 1982-83.

Though the SAIL has been successful in improving its working capital position in the recent past yet it is uncontrollable to the desired extent. Higher inventories which manifest lower demand is resulting in higher cost of production and low level of fund for supporting production and sales

activities of the SAIL. Though it is much desirable to undertake fund flow analysis of the SAIL it cannot be done so at present due to non-availability of necessary data to draw up a statement for the purpose.

According to an estimate 98% of the working capital of public. Steel plants are locked up in unsold stocks as against 30% in other Industrially advanced countries. A factor that has great bearing on the problem of unsold stock is a lead time. This has two broad components, viz., procurement which is a function of the market situation and adequacy and efficiency of suppliers. The administrative lead time has also bearing on the accumulated unsold steel. This is the factor that depends upon the organisation and its operating procedure of the procurement of steel from stock yard and inspection will help shorten the administrative lead time. This in, turn, will lead to reduction in the stock holding would release a proportion of the working capital tied up in inventories. To the market situation is related inflationery price rise which the management tries to avoid by building up inventories in the interest of stabilising prices of finished products and continues employment of workers.

Tables - 27 and 28 show an increading trend in imports during the period 1975-76 to 1983-84. It will be seen from the table that steel imports increased from 229,000 tonnes in

1975-76 to 1305,000 tonnes in 1982-83. The main reason for earning imports is attributed to a mismatch between the pattern of production and the pattern of demand on the contrary, the table displays decling trend in exports of steel. In 1975-76, the SAIL exported steel worth of 18 crores which sharply rose to 332 crores in 1976-77 but in 1982-83 it steeply declined to Rs. 2 crores. It corroborates Research Scholar's view that production does not conform to the pattern of demand in foreign markets.

TABLE - 27

EXPORT OF STEEL (SAIL)

Years	Quantity ('000 Tonnes)	Value (Rs. Crores)
1975-76	800	98
1976-77	2437	332
1977-78	1800	231
1978-79	790	128
1979-80	105	18
1980-81	49	13
1981-82	-	-
1982-83	11	2
1983-84 (April-December)	15	3

1982-83

SOURCE : The Economic Times "Steel Industry Supplement 25th Jan. 1984.

TABLE - 28

IMPORTS OF STEEL (SAIL

('000 Tonnes)

Years	Back to Back	Buffer	Mal.	Value (Rs. in crores)
1975-76	-	-	229	75
1976-77	-	-	254	87
1977-78	-	-	348	116
1978-79	537	245	782	274
1979-80	485	900	1385	449
1980-81	509	496	1005	358
1981-82	566	535	1101	364
1982-83	517	788	1305	NA
1983-84 (April-Dec)	367	110	471	NA
1982-83 (April-Dec)	448	796	1244	NA
1983-84 (Plan)	450	-	450	NA

SOURCE : "The Economic Times" Steel Industry "Supplement 25th. January, 1984.

OTHER PROBLEMS AT PUBLIC SECTOR STEEL PLANTS

Teething problem of the early period including technological difficulties and initial production bottle-necks also acted as constraints in the proper functioning of public seetor steel plants.

The investment planning at the very beginning was also responsible for idle capacity. The heavy investment were made in steel mills irrespective of the demand on the ground of economy in the subsequent stages of output expansion and partly on the ease of securing funds.

There are of course, favourable results that follow rapid expansion of output under condition of declining cost till production approximates rated capacity. Economy of compere-hensive planning of the envisaged capacity in its totality is, in fact, lost to the enterprises when they are unable to utilise full capacity, like Bhilai utilising 52% of ingot steel capacity, in 1983-84 (April-December), Durgapur 39% of its capacity, Rourkela 43%, Bokaro 47% and IISCO only 38%.

Likewise, lack of coordinated market research and development programmes untill the establishment of SAIL was and added factor causing idle capacity. Only a few public

steel mills had made efforts to increase sales. It acted as a constraint on full utilisation of capacity. The SAIL handles sales and after sales services of all products manufactured by the public sector steel plants. It has now established Zonal distribution system from where wholesaler can buy steel directly in wagon loads or in smaller quantities. These stock-yards have been established in different parts of the country. Almost all states in India have one stock-yard at least.

The quality and price control have also acted as the disincentives to new investment in the private sector steel mills and resulted in deficits in public steel plants.

The Government appears to have been most successful in controlling wholesale prices charged by the steel mills. But it has been less successful in controlling the prices of a number of small producers and retail prices charged by middle-men. As expected, there is thriving black market for most scarce steel items. As a result the large wholesalers capable of buying directly from stock-yards appear to have suffered from the Government price control policy alongwith the integ-rated steel mills.

Unduly low prices for controlled items of steel are one consequence of the Government price policy. Small price differentials for various types of steel have also encouraged

the production of poor quality steel. They have incurred a real cost to the consumer in the form of an inefficient use of resources. Thus price and distribution controls create distortion in the economy.

The failure of steel price and distrubution control had become increasingly obvious in early 1960's. The Government had appointed Ray Committee in 1962 to investigate existing control and suggest alternative. The Committee was in favour of some Government regulations to ensure allocation of steel to essential capital projects to small consumers. For this reason the Ray Committee has contamplated the partial restoration of free market for steel.

Unrealistic production targets also account for under utilisation of capacity. Management of public steel mills used to fix easily accessible targets to cover up their efficiency. It is essential that annual targets of steel output are laid down after taking into account all the relevent factors, particularly the rated capacity, size of demand which must be assessed by enterprise through market surveys. It also calls for a system of checks and balances in production planning to avoid low output targets. Efficiency audit will go a longway in ensuring optimum production.

There are many external reasons for heavy burden of inventory that public sector mills carry: Transport bottlenecks, foreign exchange problems, lack of supporting industries for the manufacturer of spares and petty items, general shortage and long waiting list with the suppliers create an atmospherewhich compel management to carry surplus inventory.

C O N C L U S I O N

In this Chapter an attempt has been made to asses the steel Industry's performance broadly in terms of financial and social (Physical) returns. Under financial return it has been observed that the SAIL made profit at a declining rate during the period 1978-79 and 1983-84. This is because of Government's policy to provide for free reserves in the form of depreciation andDRE. In 1983-84, SAIL accumulated a massive free reserves of Rs. 163 crore. The policy is against the consumer interest as depreciation is the cost of capital transferred to consumer. The SAIL has also tended to use free reserves more in repayments of loans with grew by 161.3% since 1978-79 as compared with the growth of 55.5% in equity. SAIL's PBIT shows that sizeble amount was provided for free reservs out of profit during the period 1978-79 and 1982-83, hence declining profit. The Research Scholar strongly recommends that the policy of enhancing free reserves should be dispensed with. Interest and Loans show a highly deflated figures. Interest of Rs. 32 crore on loan of Rs. 2,260 crore seem to be unrealistic rate of interest, viz. 1.4%. It is observed by the Research Scholar that if the amount of free reserves (which is used in payment of interest) is added, it becomes a fair rate of interest on loan in 1978-79, viz. 8%.

The plant-wise analysis of SAIL's working result reveals that most of the units have suffered heavy losses. Durgapur, Rourkela and Bokaro are the three steel plants saddled with heavy losses amounting to Rs.138,78 crore, 113.69 crore and 52 crore respectively during the period 1979-80 to 1983-84. The Research Scholar is afraid that the total investment of Rs. 5,719 crore will be wiped out of this negative trend persists. Amortization of loans by the government is one of the measures to avert the financial crisis. The government's steel pricing policy is also a crucial factor responsible for losses in the steel plants. The Research Scholar feels that unremunerative prices fixed by the government are the constraints on income generating capacity of the SAIL.

The profitability ratios of steel plants reveal negative trend. The cause of the negative ratios are attributed to frequent input price-hikes and, also to the lack of rationalisation of cost.

Physical performance of Steel Industry has been unsteady. It is observed from the statistical analysis that the steel plant under the SAIL have failed to reach optimum output level of 90% of the rated capacity without increasing inventory. TISCO performed wonderfully well; it utilised above 90% of the rated capacity during the period under review as against 76% of the rated capacity utilised by the SAIL.

The reasons for retarded production lie in under-utilisation of capacity and lower productivity. Besides difference in size of blast furnaces and ore-charges, lack of sintering, bedding and blending facilities, technological obsolescence, large inventories, unrealistically low production targets are the additional factors responsible for idle capacity and low productivity in the steel plants of the Public Sector.

CHAPTER - V

PRODUCTIVITY TRENDS IN PUBLIC SECTOR ENTERPRISES

The previous Chapter-IV has examined the performance of Iron and Steel Industry and brought forth the factors responsible for its failure to attain the "optimum" level of output. The main factors underlying the retarded production consists in idle capacity and low productivity.

The present Chapter V is devoted to in depth analysis of the problems of productivity in public enterprises. Table-1 presents the data of net product of public sector at current prices during 1960-61 and 1985-86. The net product which was 1422 crores increased to 43915 crores, representing an increase 30 times over. The Table also gives relative share of public and private sectors in net domestic product. The public sectors have contributed 10.66 per cent to the net domestic product in 1960-61. In 1985-86 the share of public sector in net domestic product increased to 23.15 per cent. The larger share of public sector in net domestic product is attributable to faster expansion of the public sector.

TABLE - 1

NET DOMESTIC PRODUCT ORIGINATING IN PUBLIC AND PRIVATE SECTOR
(AT CURRENT PRICES)
1960-61 to 1985-86

(Rs. in Crores)

Year	Net Product from public sector	Net product from private sector	Total Net Domestic Product	Relative share in Net Domest Product (in percentage)	
				Public Sector	Private Sector
1	2	3	4	5	6
1960-61	1422	11913	13335	10.66	89.34
1961-62	1602	12483	14085	11.37	88.63
1962-63	1836	13067	14903	12.32	87.68
1963-64	2133	14956	17089	12.48	87.52
1964-65	2381	17767	20148	11.82	88.18
1965-66	2743	18058	20801	13.19	86.81
1966-67	3068	21010	24078	12.74	87.26
1967-68	3465	24847	28312	12.24	87.76
1968-69	3939	24923	28862	13.65	86.35
1969-70	4471	27406	31877	14.03	85.97
1970-71	5048	29698	34746	14.53	85.47
1971-72	5688	30935	36623	15.53	84.47
1972-73	6272	33673	39945	15.70	84.30
1973-74	7217	42503	39720	14.52	85.48
1974-75	9063	49422	58485	15.50	84.50

Table Contd....

1	2	3	4	5	6
1975-76	10403	50269	60672	17.15	82.85
1976-77	11946	54978	66924	17.85	82.15
1977-78	14000	61674	75674	18.50	81.50
1978-79	15635	65797	81432	19.20	80.80
1979-80	17696	71231	88927	19.90	80.10
1980-81	21872	84303	106175	20.60	79.40
1981-82	25683	95123	120206	21.25	78.74
1982-83	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA
1984-85	28812	103658	132470	21.75	78.25
1985-86	43915	145783	159598	23.15	76.85

SOURCE : National Accounts Statistics: 1960-61 to 1984-85, C.S.O., Ministry of Planning, Government of India Economic Times Surveys for 1984 to 1986.

TABLE - 1.1

ESTIMATES OF NET DOMESTIC PRODUCTION FROM PUBLIC SECTOR AT 1960-61 PRICES 1960-61 to 1985-86

Departmental Category/Sector	1960-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86
1. Administrative Department:																										
1.1 Commodity Producing Sector	18	20	22	22	21	21	24	25	33	31	30	33	33	38	46	42	84	87	97	92	94	100	NA	NA	109	149
1.2 Tertiary Sector	717	778	869	864	1052	1107	1182	1153	1340	1462	1572	1750	1856	1993	2078	2130	4097	4252	4747	4505	4605	4903	NA	NA	5359	7300
1.3 All Sector	735	798	891	9861	1073	1128	1206	1278	1373	1494	1602	1785	89	2031	2124	2172	4181	4339	4844	4597	4699	5003	NA	NA	5468	7451
2. Public Enterprises :																										
2.1 Commodity Producing Sector	246	280	332	401	425	483	487	536	597	460	719	743	852	940	985	1084	2009	2088	2335	2220	2271	2421	NA	NA	2650	3620
2.2 Tertiary Sector	441	477	521	563	577	636	649	661	733	807	879	970	1017	1032	1097	1174	2172	2253	2515	2385	2435	2592	NA	NA	2831	3860
2.3 All Sectors	687	757	853	964	1002	1119	1136	1197	1330	1467	1598	1713	1869	1972	2032	2258	4181	4341	4850	4605	4706	5013	NA	NA	5481	7480
2.A Departmental Enterprises :																										
2.A.1 Commodity Producing Sector	170	189	197	221	232	259	248	259	275	284	300	311	339	321	333	366	659	635	656	425	592	562	NA	NA	633	910
2.A.2 Tertiary Sector	352	374	397	433	437	472	483	490	531	551	564	599	609	594	617	662	1223	1232	1333	756	1149	1193	NA	NA	1176	1484
2.A.3 All Sectors	522	563	594	654	669	731	731	749	806	835	864	910	948	915	950	1048	1882	1867	1989	1181	1741	1755	NA	NA	1809	2394
2.B Non-Departmental Enterprises :																										
2.B.1 Commodity Producing Sector	76	91	135	180	193	224	239	277	322	376	414	432	513	619	652	718	1287	1410	1659	2020	1779	1987	NA	NA	2277	3204
2.B.2 Tertiary Sector	89	103	124	130	140	164	166	171	202	256	315	371	408	438	430	492	1012	1064	1202	1404	1186	1271	NA	NA	1395	1882
2.B.3 All Sector	165	259	310	333	388	405	448	524	632	532	734	803	921	1057	1082	1210	2299	2474	2861	3424	2965	3258	NA	NA	3672	5086
3. Total Public Enterprises:																										
3.1 Commodity Producing Sector	264	300	354	423	446	504	511	561	630	691	749	776	885	978	1031	1126	2258	2257	2423	2393	2539	2704	NA	NA	2847	4032
3.2 Tertiary Sector	1158	1255	1390	1527	1629	1743	1831	1914	2073	2270	2451	2720	2873	3025	3125	3304	6104	6423	7271	6809	6866	7312	NA	NA	8102	10849
3.3 All Sectors	1422	1555	1744	1950	2075	2247	2342	2475	2703	2961	3200	3496	3758	4003	4156	4430	8362	8680	9694	9202	9405	10016	NA	NA	10016	14931

SOURCE : Computed by the Research Scholar from National Accounts Statistics, Ministry of Planning, Government of India, New Delhi for the years 1960-61 to 1981-82, and Economic Times Surveys for 1984-85 to 1985-86.

Table - 1.1 presents estimates of real net domestic product from public sector at 1960-61 prices by industry of origin and departmental categories. In deflating the current net domestic product from public sector to 1960-61 prices, I have used the C.S.O. price indices for the categories of industries belonging to the public sector. I have divided the whole sector into two broad categories, viz. the commodity producing sector and tertiary sector. The commodity producing sector consists of Agriculture, Forestry, Mining and Quairying, manufacturing, construction, electricity, gas and water supply while the tertiary sector comprises of the industries rendering services viz., banking, insurance, warehousing, transport, communication, hotels, reataurents and welfare services, etc.

Table-1.1 shows a rapid growth in real net domestic product during the years 1960-61 and 1985-86. The growth rates have been computed on the basis of Table-2 and presented in Table-3. The entire period of 26 years has been divided into four sub-periods. During the first sub-divided period, 1961 and 1967-68, the public sector as a whole registered a growth rate of 8.98 per cent per annum. In the next period, 1967-68 to 1975-76, the growth rate was 8.14 per cent per annum. The net domestic product from public sector had a growth rate of 9.5% per annum during

1975-76 and 1985-86. For the entire period of 26 years (from 1960-61 to 1985-86) the growth rate was 8.9% per annum.

Table-1.2 makes a comparative analysis of the growth rates between the departmental and non-departmental industries. The non-departmental enterprises have given a good account of themselves by registering the highest growth rate in real net domestic product. For the whole period 1960-61 to 1985-86, the growth rate was 14.25 % per annum.

Table-1.3 has been drawn up to examine the structural changes in the composition of aggregate output during 1960-61 and 1985-86. The departmental enterprises's share has been falling. It has fallen from 76 per cent to 32 per cent. At the same time, the share of non-departmental enterprises in 1960-61 was 24% which substantially increased to 68% in 1985-86. The real net domestic product from the public sector is largely contributed by the commodity producing enterprises. The share of commodity producing enterprises increased from 36% in 1960-61 to 55% in 1985-86. The tertiary sector's share in real net domestic product from public sector declined from 54% in 1960-61 to 45% in 1985-86.

In the light of the above analysis, it can be inferred that the commodity producing enterprises are the significant segment of the public sector.

Capital is also a major input in real terms. I have followed the perpetual Inventory Method in preparing the time series of capital stock. According to this method, I have prepared the 26 years long time series of capital formation. I have made slight modification in the method by introducing the bench-mark estimates of the net capital stock for the year 1960-61. These figures have been obtained from the different sources giving capital stock estimates of public enterprises. The main difficulty which I confronted in using these data was that they were depreciated at book-values of capital assets. I have, therefore, proceeded to use the capital out put ratio of 5.88 which is computed from the estimates of capital stock of Central Government undertakings in the bench-mark year 1960-61. This gives me an estimate of Rs. 1063 crores as the value of net capital stock in public enterprises in the manufacturing sector for the bench-mark year 1960-61. The capital stock for all the public enterprises was Rs.6322 crores in bench-mark year 1960-61. To obtain the real net capital formation, in public enterpries by the industries of origin, I have used the price indices prepared by the C.S.O.

TABLE - 1.2

GROWTH RATIO OF REAL NET DOMESTIC PRODUCT ORIGINATING IN PUBLIC SECTOR

(Per cent per annum)

Departmental/ Category/Sector	1960-61 to 1967-68	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 1985-86
1	2	3	4	5
1 Administrative Department				
1.1 Commodity Producing	4.81	6.60	9.6	7.0
1.2 Tertiary Sector	8.30	6.86	9.8	8.3
1.3 All Sectors	6.55	6.85	9.7	7.6
2. Public Enterprises:-				
2.1 Commodity Producing	11.77	8.74	10.0	10.2
2.2 Tertiary Sector	5.95	7.44	9.7	7.7
2.3 All Sectors	8.86	8.09	9.9	8.9
2.A Departmental Counterprises:-				
2.1 Commodity Producing	6.20	4.42	4.8	5.14
2.2 Tertiary Sector	4.84	4.22	2.6	3.9
2.3 All Sectors	5.52	4.32	3.7	4.5

Table Contd....

Departmental/ Category/Sector		1960-61 to 1967-68	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 1985-86
2.B	Non-Departmental :-				
1.	Commodity Producing	20.29	12.64	18.6	17.18
	Tertiary Sector	9.75	14.12	10.8	11.53
	All Sectors	15.02	13.38	14.7	14.25
3,	Total Public Sector :-				
3.1	Commodity Producing Sector	10.76	8.12	10.8	9.9
3.2	Tertiary Sector	7.21	8.16	8.2	7.8
3.3	All Sectors	8.98	8.14	9.5	8.9

SOURCE :- Computed by the Research Scholar, from Table-1.1

TABLE - 1.3

TREND IN THE OUTPUT STRUCTURE OF PUBLIC SECTOR ENTERPRISES

(Figure in Per cent)

Deaprtmental/ Category Sector.	1960-61	1965-66	1970-71	1975-76	1980-81 %	1985-86
Departmental Enterprises :						
Commodity Producing sector	24.74 (32.37)	23.14 (35.43)	18.77 (34.72)	16.21 (34.92)	12.6(31) 24.4(68)	12.2(38.1 19.8(61.9
Tertiary Sector	51.24 (67.43)	42.18 (64.57)	35.30 (65.25)	30.20 (65.08)	37.00 (100.0)	32.0 (100)
All Sectors.	75.98 (100)	54.07 (100)	46.41 (100)	46.51 (100)		
Non-Departmental Enterprises :						
Commodity Producing Sector	11.06 (46.06)	20.02 (57.73)	26.22 (57.08)	31.80 (59.34)		42.8(62.9)
Tertiary Sector	12.96 (53.94)	14.66 (42.27)	19.71 (42.92)	21.79(40) (40.66)	25.2(40)	25.2(37.1)
All Sectors.	24.02 (100.00)	34.66 (100)	25.92 (100)	53.59 (100)	63.00 (100)	68.0(100

Table Contd.....

(Figures in Per cent)

Departmental/ Category Sector	1960-61	1965-66	1970-71	1975-76	1980-81 %	1985-86
Total Public Enterprises:						
Commodity Producing Sector	35.80	43.16	44.99	48.01	50.4	55.0
Tertiary Sector	64.2	56.84	55.01	51.99	49.6	45.0
All Sectors	100.00	100	1000	100	100	100

Note :- Figures in brackets indicate the Sectoral distribution of real net product within each departmental category.

SOURCE : Computed by the Research Scholar from Table-1.1

The estimates of net capital formation in public enterprises at 1960-61 price level have been presented in Table-2 for the period 1960-61 to 1985-86. It is evident from the table that the net capital formation has been quite rapid. In 1960-61, the capital formation was of the order of Rs.686 crores as compared with Rs. 3505 crores in 1985-86. The commodity producing enterprises claimed a lions share of it, viz. Rs. 2664 crores in contrast with Rs. 517 crores in 1960-61. Of the two types of industries, most of the capital formation took place in non-departmental enterprises. In 1960-61, capital formation in non-departmental enterprises was Rs. 412 crores which increased to Rs. 2103 crores in 1985-86. On the other hand, departmental enterprises were far behind the non-departmental enterprises with capital formation of Rs. 1402 crores in 1985-86. However, there has been increase in absolute terms in capital formation in departmental enterprises over a period of time under review from Rs. 74 crores in 1960-61 to Rs. 1402 crores in 1985-86.

Table-2.1 presents the estimates of net stock capital at 1960-61 prices during the period 1960-61 and 1985-86. The capital stock has grown six times over the past during the period under review from Rs.6322 crores to Rs. 40262 crores. The rapid expansion in capital stock is largely attributed to faster capital formation in non-departmental

enterprises, wherein it shot up from Rs. 1744 crores to 20445 crores thereby showing an increase equal to 11 times. The departmental enterprises have accumulated real net stock of capital at slow but steady rate from Rs. 4578 crores to Rs. 19817 crores during the period under review.

Table-2.2 gives a synoptic view of the growth rates of capital stock in public enterprises. Further to minimise time variation in growth rates, the total period has been divided into three sub-periods. Growth rate for public enterprises as a whole in the first and sub-period from 1960-61 to 1967-68 was 11%. In the second sub-period 1967-68 to 1975-76 the net capital accumulation was slow ___ 6.73% per annum. In the last sub-period 1975-76 to 1985-86, the capital stock has registered a growth rate of 8.6% per annum. On the basis of this analysis presented in Table-2.2 it can be observed that there has been declaration in the capital stock accumulation. For the whole period 1960-61 to 1985-86 the growth rate in real net capital stock was 9% per annum.

The comparasion in growth rates of departmental and non-departmental enterprises is quite revealing. The non-departmental enterprises come first with an average growth rate of 10.9% per annum followed by departmental enterprises

with an average growth rate of 7% per annum. The deceleration in capital stock accumulation was more pronounced in non-departmental enterprises in the sedond sub-period of the study.

Table-2.3 reveals further structural changes in real capital stock of different types of enterprises. The Capital structure of public enterprises as a whole in 1960-61 was such as commodity producing enterprises employed 52% of the capital and the tertiary enterprises 48%. The capital structure underwent a substantial change over the period of time under review. The commodity producing enterprises accumulated more and more of the capital stock. So much so that 69% of the capital stock was employed by them in 1985-86. The share of the tertiary enterprises went on dwindling till it touched the new low at 31% in 1985-86. Further, analysis brings out a sharp contrast in trends obtaining in capital structure of departmental enterprises and non-departmental enterprises. In the base year 1960-61 departmental enterprises had employed 22% of the total capital of public enterprises, which sharply declined to 49% in 1985-86. Of it 28% was employed by the departmental commodity producing enterprises in 1960-61. Their capital stock decreased by 4% (24.2%) in 1985-86. On the other hand, the

tertiary enterprises witnessed heavy decline in their share of capital stock from 44% in 1960-61 to 25% in 1985-86. The non-departmental enterprises over all share in capital stock increased from 28% in 1960-61 to 51% in 1985-86. Looking at the figures for capital structure in non-departmental enterprises, it may be easily discerned that almost the entire increase is accounted by the commodity producing enterprises. Of 51% of total capital, 45% was employed by non-departmental commodity producing enterprises in 1985-86 in contrast with 24% in 1960-61. The commodity producing enterprises have actually registered an increase of twice as much in 1985-86.

In departmental enterprises, tertiary sector continues to dominate the scene of the capital structure as is evident from the sectoral distribution of capital within the industry. The tertiary sector employed 60% of the total capital of the departmental enterprises in 1960-61 and 51% in 1985-86. In this way, the tertiary sector though a dominant sector, is giving way to commodity producing sector of departmental enterprises. The share of commodity producing sector of departmental enterprises in capital stock has grown from 39% in 1960-61 to 49% in 1985-86. Non-departmental enterprises have emerged mainly with the growth of commodity producing sector. The share of commodity

TABLE - 2

ESTIMATES OF NET CAPITAL FORMATION IN PUBLIC ENTERPRISES AT 1960-61 PRICES 1980-81 to 1985-86

(Rs. in Crores)

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector
1	2	3	4	5	6	7	8	9	10
1960-61	274	121	153	412	396	16	686	517	169
1961-62	374	178	196	375	328	47	749	506	243
1962-63	479	210	266	408	387	21	887	600	287
1963-64	549	227	322	476	459	17	1025	686	339
1964-65	583	260	323	502	476	26	1085	736	349
1966-67	544	276	268	671	584	87	1215	860	355
1966-67	481	257	224	601	547	54	1082	804	278
1967-68	426	229	197	566	496	70	992	725	267
1968-69	436	254	181	536	419	117	971	673	298
1969-70	395	261	134	450	419	31	845	680	165
1970-71	436	273	163	596	449	147	1032	722	310
1971-72	501	295	205	592	489	103	1093	784	309
1972-73	534	297	237	524	561	-37	1058	858	200
1973-74	533	335	198	761	582	179	1294	917	377
1974-75	511	281	230	709	571	138	1220	852	368
1975-76	630	366	264	992	734	258	1622	1100	522
1976-77	646.12	320	326.12	834.88	551.68	83.20	1280	870	410
1977-78	642.30	414.30	427.99	869.70	784.09	85.60	1712	1198	514
1978-79	869.40	439.28	430.12	1020.60	898.13	122.47	1890	1323	567
1979-80	914.48	457.24	457.24	1140.52	992.67	147.85	2055	1438	617
1980-81	883.36	436.22	447.14	1274.64	1136.84	137.79	[illegible]	1127	[illegible]
1981-82	854.56	443.65	410.43	1237.42	1097.00	140.42	2092	1692	[illegible]
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984-85	1212.81	630.73	582.04	1661.19	1422.23	138.96	2874	2154	[illegible]
1985-86	1481.10	701	701	2123.00	1982.00	141.00	3605	2683	[illegible]

SOURCE : National Accounts Statistics: 1960-61 to 1981-82, C.S.O., Ministry of Planning, Government of India, New Delhi and the Economic Times Surveys, from 1984-85 to 1985-86, New Delhi

TABLE - 2.1

ESTIMATES OF NET STOCK OF CAPITAL IN PUBLIC ENTERPRISES AT 1960-61 PRICES

(Rs. in Crores)

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector
1	2	3	4	5	6	7	8	9	10
1960-61	4578	1786	2792	1744	1494	250	6322	3280	3042
1961-62	4952	1964	2988	2119	1822	297	7071	3786	3285
1962-63	5431	2177	3254	2527	2209	318	7958	4386	3572
1963-64	5980	2404	3576	3003	2668	535	8993	5072	3911
1964-65	6563	2664	3899	3505	3144	361	10068	5808	4260
1965-66	7107	2940	4167	4176	3728	448	11283	6668	4615
1966-67	7588	3197	4391	4777	4275	502	12365	7472	4893
1967-68	8014	3426	4588	5343	4771	572	13357	8197	5160
1968-69	8449	3680	4769	5879	5190	689	14328	8870	5458
1969-70	8844	3941	4903	6329	5606	720	15173	9550	5623
1970-71	9288	4214	5066	6925	6058	867	16205	10272	5933
1971-72	9781	4509	5272	7517	6547	970	17298	11056	6242
1972-73	10315	4806	5509	8041	7108	933	18356	11914	6442
1973-74	10848	5141	5707	8802	7690	1112	19650	12831	6819
1974-75	11359	5422	5937	9511	8261	1250	20870	13683	7187
1975-76	11908	5788	6201	10503	8995	1508	22492	14783	7709
1976-77	126840	6108	65760	111380	9547	1591	23777	15635	8112
1977-78	13476	6522	6954	12008	10331	1677	25484	16851	8633
1978-79	14346	6962	7371	13028	11220	1784	27374	18174	9200
1979-80	15119	7416	7823	14103	12222	1947	29222	19612	9817
1980-81	161460	7917	8315	15443	13358	2085	31693	21280	10150
1981-82	17108	8411	8776	16681	14455	2225	33883	22941	11042
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984-85	19418	9032	9870	19384	17021	2363	38802	26053	11761
1985-86	19817	9733	10071	20443	17941	2504	40260	27661	12601

SOURCE : Computed by an Assistant Director from Table-1.

TABLE - 2.2

GROWTH RATES OF CAPITAL STOCK IN PUBLIC ENTERPRISES

(per cent per annum)

Departmental Category	1960-61 to 1967-68	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 1985-86
Departmental Enterprises:				
Commodity Producing Sector	9.75	6.78	7.4	7.8
Tertiary Sector	7.35	3.84	6.8	6.1
All Sectors	8.33	5.16	7.1	7.0
Non-Departmental Enterprises :				
Commodity Producing Sector	18.04	18.25	10.1	11.8
Tertiary Sector	12.55	12.88	7.1	10.9
All Sector	17.34	8.82	10.5	10.9
Total Public Enterprises :				
Commodity Producing Sector	13.98	7.65	9.6	9.8
Tertiary Sector	7.84	5.15	6.9	8.1
All Sectors	11.28	6.73	8.6	9.0

SOURCE : Computed by the Research Scholar from Table-2.

TABLE - 2.3

TRENDS IN CAPITAL STRUCTURE OF PUBLIC ENTERPRISES

(Per cent)

Departmental Category	1960-61	1965-66	1970-71	1975-76	1980-81	1985-86
Departmental Enterprises :						
Commodity Producing Sector	28.25 (39.01)	26.06 (41.37)	26.00 (45.41)	25.73 (48.20)	25.0(49)	24.2(48.8)
Tertiary Sector	44.16 (60.99)	36.93 (58.63)	31.27 (54.59)	27.57 (51.72)	26.3(51)	25.0(51.2)
All Sectors	72.41 (100)	62.99 (100)	57.27 (100)	53.30 (100)	51.3 (100)	49.2(100)
Non-Departmental Enterprises :						
Commodity Producing Sector	23.63	33.04	37.39	40.00	42.2	44.6(87.8)
Tertiary Sector	3.96 (14.33)	3.97 (10.73)	5.34 (12.52)	6.70 (14.36)	6.5 (13)	6.2(12.2)
All Sectors	27.59 (100)	37.01 (100)	42.73 (100)	46.70 (100)	87.7 (100)	50.8 (100)

Table Contd...

(Per cent)

Departmental Category	1960-61	1965-66	1970-71	1975-76	1980-81	1985-86
Total Public Enterprises :						
Commodity Producing Sector	51.88	59.10	63.39	65,73	67.2	68.8
Tertiary Sector	48.12	40.90	36.61	34.27	32.8	31.2
All Sectors	100.00	100.00	100.00	100.00	100.00	100.00

Note : Figures in brackets indicate the Sectoral distribution of net capital stock within the each departmental category.

SOURCE : Computed by the Research Scholar from Table-2.

producing sector of non-departmental enterprises in the capital stock has remained almost constant, 86% of the total capital of non-departmental enterprises was used in commodity producing sector in 1960 and 88% in 1985-86, leaving tertiary sector with 14% and 12% in 1960-61 and 1985-86 respectively.

The pattern of distribution of capital stock suggests that commodity producing sector in public enterprises as a whole is the largest segment.

Labour is an important input. The contribution to the total out put has to be estimated with the help of basic data on out put and labour input. Table-3 has been drawn up to indicate employment generated by public enterprises during the period 1960-61 and 1985-86. The employment for the same period has been shown by departmental categories. Total employment in public sector enterprises has increased from 30.75 lakhs in 1960-61 to 81.96 lakhs in 1985-86. The number of workers in non-departmental enterprises increased from 5.75 lakhs in 1960-61 to 57.02 lakhs in 1985-86, while in departmental enterprises employment increased from 24.80 in 1960-61 to 34.94 lakhs in 1985-86. By contrast, the non-departmental enterprises are employing more workers than the departmental enterprises and by categories of sector, the

commodity producing sector of the public enterprises is employing more workers than the tartiary sector. The inference can be drawn from Table-3 that number of workers has gone up substantially during the period under review.

Table-3.1 has been prepared from the figures given in Table-3 I have computed growth rate of employment in public enterprises departmental-wise and broad sector-wise. I have measured the growtn rate of employment for three sub-periods. Taking the first sub-period, 1960-61 to 1967-68, into account the average growth rate of all the public enterprises was 4.91 per cent per annum, exceeded by only commodity producing sector with 6.85 per cent per annum. The tertiary sector had on average less workers; the growth rate in this sector was 3.45 per cent per annum during the same sub-period, 1960-61 to 1967-68, there is vast disparity in the growth rate of employment in departmental and non-departmental enterprises. Number of workers went up in departmental enterprises at the rate of 2.90 per cent per annum in contrast with 11.47 per cent per annum in non-departmental enterprises. Within the departmental enterprises, the growth rate of employment in commodity producing sector is higher than that in tertiary sector 3.48% per annum for commodity producing sector and 2.61% per annum for tertiary sector. In non-departmental enterprises the growth rate of

employment is 12.01% for the commodity producing sector as compared with 10.03% per annum for the tertiary sector of the non-departmental enterprises.

The subsequent sub-period 1967-68 to 1975-76 has registered an increase in the growth rate of employment in public enterprises. In this sub-period the average growth rate of employment is 5.05% per annum. The commodity producing sector employed workers at a rate more than the average, 6.80% per annum. The tertiary sector shows the growth rate less than the average rate, 3.36% per annum. Looking at the classification of growth rate by departmental and broad sector categories, the average growth rate of employment in non-departmental enterprises is substantially higher than the average growth rate of all the public enterprises—— 11.30% per annum. The departmental enterprises employed additional workers at the rate of 1.39% per annum, less than the average growth rate. In this sub-period, the tertiary sector of the departmental enterprises had attained a higher growth rate of employment than the commodity producing sector-1.45% per annum as against 1.28% per annum for the commodity producing sector.

The last sub-period, 1975-76 to 1985-86 presents an interesting picture of growth rate of employment in Public enterprises. The average growth rate of employment in

TABLE - 3

ESTIMATED EMPLOYMENT TO PUBLIC ENTERPRISES
BY DEPARTMENTAL CATEGORIES AND BROAD SECTORS
1960-61 to 1975-76 AND 1976-77 to 1985-86

(Figures in Lakhs)

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	Commodity Producing Sector	Tertiary Sector	All Sector	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors
1	2	3	4	5	6	7	8	9	10
1960-61	8.27	16.35	24.80	4.25	1.70	5.95	12.52	18.23	30.75
1961-62	8.42	16.90	25.32	5.00	2.19	7.19	13.42	19.09	32.51
1962-63	8.76	17.60	26.36	6.25	2.42	8.07	15.01	20.02	35.03
1963-64	9.07	18.41	27.48	7.43	2.52	9.95	16.50	20.93	37.43
1964-65	9.58	19.06	28.64	7.91	2.93	10.84	17.49	21.99	39.48
1965-66	10.60	19.53	30.13	8.23	3.01	11.24	18.83	22.54	41.37
1966-67	10.28	19.79	29.98	8.88	3.13	12.01	19.16	22.83	41.99
1967-68	10.51	19.79	30.30	9.40	3.32	12.72	19.91	23.11	43.02
1968-69	10.25	19.96	30.21	10.01	3.00	13.51	20.26	23.46	43.72
1969-70	10.28	20.27	30.55	10.78	4.50	15.28	21.06	24.77	45.83
1970-71	10.65	20.67	31.32	11.69	4.95	16.64	22.34	25.62	43.96
1971-72	10.68	20.95	31.63	13.66	5.48	19.14	24.34	26.43	50.77
1972-73	11.60	21.03	32.63	16.73	6.57	23.30	28.33	27.60	55.93
1973-74	11.13	21.31	32.44	20.16	6.84	27.00	31.29	28.15	59.44
1974-75	10.79	21.81	32.51	20.69	8.02	28.71	31.38	29.83	61.22
1975-76	11.64	22.20	33.84	22.05	7.90	29.95	33.69	30.30	63.79
1976-77	11.86	23.00	34.86	25.12	8.37	33.49	36.98	31.37	68.35
1977-78	10.23	19.85	30.08	26.96	8.52	35.45	37.11	28.37	64.56
1978-79	11.99	22.26	34.25	29.74	8.88	38.62	41.73	31.14	72.87
1979-80	11.69	22.69	34.38	32.76	9.24	42.00	44.45	31.93	76.38
1980-81	11.41	22.16	33.58	36.63+	9.74	46.37	48.05	31.90	79.95
1981-82	11.09	22.53	33.62	40.34	10.08	50.42	51.43	32.61	84.04
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984-85	11.10	22.49	33.49	44.21	10.38	54.64	55.31	32.87	88.18
1985-86	11.13	23.06	34.34	46.19	10.83	57.02	58.37	33.89	91.36

SOURCE : National Accounts Statistics: 1960-61 to 1984-85 C.S.O. Ministry of Planning, Government of India, and the Economic Times Survey 1985-86, New Delhi.

TABLE - 3.1

GROWTH RATES OF EMPLOYMENT IN PUBLIC ENTERPRISES

Departmental Enterprises	1960-61 to 1967-68	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 1985-86
Commodity Producing Sector	3.48	1.28	0.021	1.17
Tertiary Sector	2.61	1.45	0.033	1.01
All Sectors	2.90	1.39	0.028	1.09
Non-Departmental Enterprises:				
Commodity Producing Sector	12.01	11.25	10.5	11.05
Tertiary Sector	10.03	11.45	3.8	7.29
All Sectors	11.47	11.30	7.14	69.17
Total Public Enterprises :				
Commodity Producing Sector	6.85	6.80	7.12	7.00
Tertiary Sector	3.45	3.36	1.00	2.20
All Sectors	4.91	5.05	4.06	4.60

SOURCE : Compiled and computed by the Research Scholar from Table-3.

TABLE - 3.2

TRENDS IN THE EMPLOYMENT STRUCTURE OF PUBLIC ENTERPRISES

(Per cent)

Departmental Enterprises	1960-61	1965-66	1970-71	1975-76	1980-81	1985-86
Commodity Producing Sector	26.89 (33.35)	25.62 (35.18)	22.21 (34.00)	18.25 (34.4)	14.28 (34.00)	12.92 (34.00)
Tertiary Sector	53.76 (66.65)	47.21 (64.82)	43.09 (66.00)	34.80 (65.60)	27.72 (66.00)	25.08 (66.00)
All Sectors	80-65 (100.00)	72.83 (100.00)	65.30 (100)	53.05 (100)	42.00 (100)	38.00 (100)
Non-Departmental Enterprises :						
Commodity Producing Sector	13.83 (71.43)	19.90 (73.22)	24.37 (70.25)	34.57 (73.62)	45.82 (79.00)	50.32 (81.16)
Tertiary Sector	5.52 (28.57)	7.27 (26.78)	10.33 (29.75)	12.38 (26.38)	12.18 (21.00)	11.68 (18.84)
All Sectors	19.35 (100.00)	27.17 (100.00)	34.17 (100.00)	46.00 (100)	58.00 (100.00)	62.00 (100)

Table Contd.....

(Per cent)

Departmental Enterprises	1960-61	1965-66	1970-71	1975-76	1980-81	1985-86
Total Public Enterprises :						
Commodity Producing Sector	40.72	45.52	46.58	52.81	60.10	63.24
Tertiary Sector	59.28	54.48	53.42	47.19	39.90	36.76
All Sector	100.00	100.00	100.00	100.00	100.00	100.00

Note : Figures in Parenthesis indicate the Sectoral distribution of employment within each departmental category.

SOURCE : Compiled and computed by the Research Scholar from Table-3.

TABLE - 4

TREND IN RELATIVE FACTOR SHARE IN PUBLIC AND PRIVATE ENTERPRISES (AVERAGE SHARE OF LABOUR AND CAPITAL IN VALUE ADDED AT CONSTANT PRICES)

(Per cent)

Departmental/Non-departmental Sector	1961-62 to 1965-66		1965-66 to 1970-71		1970-71 to 1975-76		1975-76 to 1979-80		1980-81 to 1985-86		1960-61 to 1985-86	
	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital
Departmental Enterprises :												
Commodity Production Sector	60.80	39.20	61.06	38.94	64.52	35.48	73.51	26.48	87.50	12.50	74.00	17.10
Tertiary Sector	62.33	37.67	67.51	32.49	73.83	26.17	77.60	23.40	86.11	13.89	77.07	22.73
All Sectors	61.77	38.23	65.27	34.73	69.81	30.19	75.59	24.41	86.81	13.19	76.02	23.98
Non-Departmental Enterprises:												
Commodity Producing Sector	59.89	40.11	56.32	43.68	60.00	40.00	65.85	34.15	69.00	31.00	64.02	35.98
Tertiary Sector	54.61	45.39	59.32	40.68	61.98	38.02	66.92	33.08	66.75	33.25	67.72	32.27
All Sectors	57.10	42.90	57.66	42.32	60.32	39.01	66.39	33.61	67.87	32.13	63.37	36.63
Total Public Enterprises:												
Commodity Producing Sector	60.32	39.78	58.63	41.37	61.30	38.70	69.71	30.29	78.25	21.75	69.14	30.86
Tertiary Sector	60.41	39.59	64.80	35.20	67.91	32.19	70.29	29.74	76.44	23.57	74.04	25.96
All Sectors	60.85	39.72	62.07	37.93	64.47	35.13	69.49	30.48	77.34	22.66	71.60	28.40

Source : National Accounts Statistics, 1949-50 to 1984-85 C.S.O., Ministry of Planning, Government of India, New Delhi and the Economic Times Surveys, 1985-86, New Delhi.

Public Enterprises is 4.06% per annum, exceeded by the commodity producing sector with 7.12% per annum. The tertiary sector of Public Enterprises has registered a very meagre growth rate of 1.00% per annum. In other words, the commodity producing sector is the main employer of additional workers in Public Enterprises as revealed by the data classified into departmental and non-departmental enterprises and broad sectors. The commodity producing sector employed additional workers at 10.5% per annum with tertiary sector at 3.8% per annum. The growth rates of employment in departmental enterprises, comprising both commodity producing and tertiary sector was insignificant in the last sub-period. The average growth rate of employment in departmental enterprises was 0.028% per annum.

The growth rate of employment for the whole period 1960-61 to 1985-86 is the average growth rate for the sub-periods. It is worth citing that the average growth rate of employment in Public Enterprises was 4.60% per annum. Non-departmental enterprises employed most of the additional workers in Public Enterprises throughout the period, viz. 19.17% per annum. The departmental enterprises seem to be employing small number of additional workers the growth rate of employment being 1.09%. The non-departmental

enterprises largely employed additional workers in the commodity producing sector, the average growth rate being 11.0% per annum. The tertiary sector attained the growth rate of employment of 7.2% per annum.

Table-3.2 presents the trends in the employment structure of the Public Enterprises. I have drawn up this table on the information given in Table-3 Substantial-changes have occurred in the employment structure of Public Enterprises, existing in 1960-61, it may be observed that departmental enterprises were the main employer in Public Enterprises with 80.65% of the total. In other words the non-departmental enterprises employed 19.35% of total labour force in Public Enterprises. In 1960-61, the tertiary sector of Public Enterprises was the dominant employer with 59.28% of the total number of workforce in Public Enterprises and the commodity producing sector had employed 40.72% of the total. The share of departmental enterprise, however, declined from 80.65% in 1960-61 to 72.73% in 1975-76. The intervening five year are marked with substantial change in employment structure within the departmental enterprise. The commodity producing sector and tertiary sector both employed less workers. The share of the commodity producing sector of departmental enterprises declined less steeply than that of the tertiary sector. The commodity producing sector of the departmental enterprises was still employing 35.18% of the total work

force. But tertiary sector lost 2% of the work force to the non-departmental enterprises. In non-departmental enterprises rising trend is discernible. The number of workers went up from 19% in 1960-61 to 27% in 1965-66. Increase in total work force in 1965-66 was quite substantial in commodity producing sector. They were now employing 19.90% of the total work force. The tertiary sector of non-departmental enterprises also employed more of the workers in 1965-66. There was increase in the share of tertiary sector in total employment from. 5.25% to 7.27% in 1965-66. In 1965-66 the overall employment structure underwent a change in favour of commodity producing sector. There has been increase in total work force of the commodity producing sector by 5% approximately. In other words, 5% of the work force was withdrawn from the tertiary sector by 1965-66.

The subsequent quinquennial period, ending 1970-71 further witnessed changes in the employment structure of public enterprises. During the periodthe commodity producing sector employment gained further rise from 45.4% in 1965-66 to 46.6% in 1970-71. In other words the tertiary secto had less of the work force by 1970-71 of the two main groups of enterprises in the public sector non-departmental enterprises employed more of the workers in 1970-71 than

in 1965-66. The work force in non-departmental enterprises increased from 27.17% in 1965-66 to 34.70% in 1970-71. The departmental enterprises had lost the work force by 7.53% to the non-departmental enterprises. In 1975-76 the share of the commodity producing sector in Public Enterprises further increased to 52.81%. The commodity producing sector emerged predominant sector in terms of employment in public sector enterprises. The tertiary sector had lost work force by 6% approximately. The change is mainly brought about by non-departmental enterprises. In 1975-76, the commodity producing experienced a sharp increase in total employment from 29.37% in 1970-71 to 34.57% in 1975-76. The increase in employment in non-departmental enterprises of the tertiary sector was marginal from 10.33% in 1970-71 to 12.38% in 1975-76. The departmental enterprises had 53.05% of the total work force in 1975-76 as against 65.30% in 1970-71.

The commodity producing sector of the public enterprises experienced further increase in the employment during the last periods 1980-81 and 1985-86, in contrast with 36.76% in the tertiary sector. Like wise the non-departmental enterprises had emerged as the leading employer with 62% of the total employment in 1985-86 as compared with 58% in 1980-81.

It may be observed that the change in the employment structure has taken place in favour of the commodity producing sector. The non-departmental enterprises has emerged as leading employer.

In the scheme to measure productivity, functional distribution of factor income in public enterprises during 1960-61 and 1985-86, has been estimated. The functional income implies the income of labour and the income of capital in the form of rent and interest. Table-4 reveals the quinquenial averages and the average income of the main factors for the period as a whole. The first sub-period 1960-61 to 1965-66, labour income in commodity producing sector of Public Enterprises was 60.22% and that of capital 39.78%. In tertiary sector the labour income was higher than that in commodity producing sector- 60.41%. On average the labour income for the first sub-period was 60.4% and that of capital 39.71. In the subsequent period 1965-66 to 1970-71 the labour income registered an increase of 1.78%. This increase is largely attributable to labour income in tertiary sector which was 64.80% during the second sub-period 1965-66 to 1970-71. However, the labour income in commodity producing sector in Public Enterprises declined to 58.63% whereas the income of capital increased to 41.37%. In the third quinquenial period 1970-71 to 1975-76,

there was substantial increase in the labour income, 64.87% in 1970-71 to 1975-76 as against 62.7% in the previous five years period. The higher labour income is accounted by increases in labour income in both the commodity producing sector and tertiary sector. The subsequent quinquenial average income of labour displays rising trend. For instance, during 1975-76 to 1979-80 it was 69.98% which increased to 77.34% in the last sub-period, 1979-80 to 1985-86. For the period as a whole the average labour share was 69.98%, in the net income originating in public enterprises. The table suggests an upward trend in labour income.

The above observations have been corroborated by average real earnings of workers in Public Enterprises in Table-4.1. In the bench-mark year 1960-61, the average annual real earnings of labour was Rs. 1408 which increased to Rs. 1641 in 1965-66. The labour's real earnings further increased to Rs. 2081 in 1970-71. In 1975-76 the labour received real income of Rs. 2430 which substantially improved in the subsequent sub-periods. For instance in 1985-86 the real earnings of labour in Public Enterprises was Rs. 9353. The real earnings of the labour in 1985-86 was 7 times the real earnings received by labour in 1960-61.

The labour and capital productivity has been estimated, in terms of labour output ratio and capital output ratio.

The average labour productivity has been obtained by dividing the real net output with total number of workers employed in different categories of public enterprises. Table-5 has been prepared from Table-1.1 and Table-3 pertaining to real net output and total employment respectively. The labour output ratio in the bench-mark year of the time series, 1960-61, was Rs. 2234. In 1965-66, labour attained higher productivity with out-put of Rs. 2705/- per worker. There was further improvement in the labour productivity by the terminal quinquennial year, 1970-71; the labour productivity was Rs. 3374/- In 1975-76, the labour productivity went up to Rs. 3540/-. The year 1985-86 marked the highest labour productivity of Rs. 12027. On the basis of this trend, it may be observed that the labour productivity in Public Enterprises on average has been steadily moving upward. The increase in labour productivity has been more in tertiary sector than in commodity producing sector. Comparing the labour productivity in departmental enterprises and non-departmental enterprises, the non-departmental enterprises have registered a sharp increase in labour productivity during 1960-61 and 1985-86 from Rs. 1783 to Rs. 10539.

Capital intensity has been measured by dividing the real capital stock with total number of workers employed. The public enterprises are capital intensive. Table-5.1

has been drawn up to show the trends in capital intensity. Capital per worker has been increasing during the period 1960-61 to 1985-86. In Public Enterprises on an average capital of Rs. 20559 was employed. In 1965-66 more capital is employed for workers Rs. 27273/-. In 1970-71 the real capital per worker further increased to Rs. 33789/-. In 1975-76, larger amount of capital was used per worker, with Rs. 35239/-. In 1985-86, the capital per worker was largest i.e. Rs.469891.00.

Capital intensity has been disparate in commodity and tertiary sector of Public Enterprises. The commodity producing enterprises are more capital intensive than the tertiary sector. In 1960-61 capital per worker in commodity producing sector was Rs. 26,198/- as compared with Rs. 16,687.00 in the tertiary sector. In 1970-71 the difference was wider with capital of Rs. 45,423/- used in commodity producing sector in contrast with the capital of Rs. 23,617,00 used in the tertiary sector. The same pattern of capital intensity existed even in 1985-86. Difference in the capital intensity apart, the commodity producing and tertiary sector continued to be the user of high degree of technology.

Allocation of capital to departmental and non-departmental enterprises shows that departmental enterprises have tended to use more capital per worker than the non-departmental enterprises. In 1960-61 non-departmental enterprises

used more capital per worker than the departmental enterprises. This pattern of distribution of capital did not change in 1974-75 as well. Since 1975-76 departmental enterprises emerged as major user of capital; the capital per worker in 1975-76 was Rs. 35,138.00 in departmental enterprises as against Rs. 35,068 in non-departmental enterprises. The subsequent period ending 1985-86 further strengthened the shift of capital to departmental enterprises. The capital intensity in departmental sector was Rs. 62801/- as against Rs. 30,982/- in non-departmental enterprises.

Table-5.2 reveals trend in capital productivity in Public Enterprises. The capital productivity is measured as an average derived by dividing the output with the total capital employed. The average capital productivity passes through two phases. The first phase is characterised by rising trend in capital productivity during 1960-61 and 1975-76. The subsequent period is generally marked by the declining trend in capital productivity. The two segments of Public Enterprises, that is, commodity producing and tertiary sector, have common features in respect of trends in capital productivity. The difference lies in the rates of increase and fall. In 1960-61 the capital productivity was 13.33 which marginally went up to 13.64 in 1975-76, while

the capital productivity in tertiary sector was 6.90 which increased to 7.81 in 1967-68. Till 1975-76, the capital productivity remained almost unchanged. During the subsequent period, 1976-77 to 1985-86, the capital productivity in both the sectors continued to fall till it touched the lowest level of 6.80 for commodity producing sector and 3.38 for tertiary sector.

The departmental and non-departmental enterprises registered different trends in capital productivity. The contrast is presented by the capital productivity trend in departmental enterprises which continued to increase in the first phase, viz. 1960-61 to 1975-76. The Capital productivity in non-departmental enterprises does not follow a set pattern. The period of rising trend in capital productivity in non-departmental enterprises is shorter than that in departmental enterprises the period of rising trend in capital productivity extends from 1960-61 to 1968-69. Further in subsequent periods the capital productivity in non-departmental enterprises began to decline. The decline took place in capital productivity of the departmental enterprises only after 1975-76. Difference in capital productivity for different periods is attributable to disparate capital intensity.

TABLE - 5

TRENDS IN NET PRODUCT PER PERSON EMPLOYED IN PUBLIC ENTERPRISES

(Rs. 1960-61 Price)

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors
1	2	3	4	5	6	7	8	9	10
1960-61	2056	2129	2105	1788	5235	2773	1965	2419	2234
1961-62	2245	2213	2224	1920	4703	2698	2086	2499	2329
1962-63	2249	2250	2253	2160	5124	2987	2212	2602	2435
1963-64	2437	2352	2380	2423	5159	3116	2430	2690	2575
1964-65	2443	2417	2426	2722	5449	3452	2565	2822	2705
1966-67	2412	2452	2438	2691	5304	3372	2542	2843	2705
1967-68	2464	2476	2472	2947	5151	3522	2692	2860	2782
1968-69	2883	2660	2668	3217	5771	3879	2947	3124	3042
1969-70	2763	2718	2733	3483	5688	4136	3134	3253	3301
1970-71	2817	2729	2759	3684	6364	4411	3218	3431	3332
1971-72	2912	2859	2877	3163	6770	4195	3053	3670	3374
1972-73	2923	2896	2909	3066	6210	3953	3007	3085	3342
1973-74	2884	2777	2821	3070	6404	3915	3004	3666	3318
1974-75	3113	2829	2922	3151	6362	3769	3138	3510	3319
1975-76	3149	3072	3097	3256	6228	4040	3218	3900	3540
1976-77	4658	4628	4743	4325	10626	7476	4512	7628	6110
1977-78	5464	4866	5165	4595	10868	7732	5030	7867	6449
1978-79	5284	5146	5203	4986	12158	8572	5135	8652	6869
1979-80	5431	5276	5328	5525	13808	9665	5563	9531	7547
1980-81	6310	5887	6108	7561	15620	11510	6945	10753	8849
1981-82	7118	6542	6812	7030	17504	12272	7030	12054	9442
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984-85	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1985-86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOURCE : Direct [illegible] Ministries, Compiled from Columns-1.1 and 3.

TABLE - 5.1

TRENDS IN REAL CAPITAL STOCK PER PERSON EMPLOYED IN PUBLIC ENTERPRISES

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing	Tertiary Sectors	All Sectors
1	2	3	4	5	6	7	8		
1960-61	21596	16891	18460	35153	14706	29311	26198	16687	20559
1961-62	23325	17680	19558	35440	13562	29471	28212	17208	21750
1962-63	24852	18489	20603	35344	13140	29146	29221	17842	22718
1963-64	26805	19424	21761	35908	13294	30181	30739	18686	23999
1964-65	27808	20456	22916	36747	12321	32334	33238	19372	25502
1965-66	27736	21336	23583	43298	14884	37153	35412	20475	27273
1966-67	31009	22289	25319	44142	16038	39775	38998	21432	29417
1967-68	32[illegible]	23163	26449	50786	17223	42009	41171	22328	31048
1968-69	35902	23893	27966	51648	19686	43516	43781	23265	33772
1969-70	38837	24188	28949	52032	16007	41420	45347	22701	33107
1970-71	39868	24509	29630	51822	17515	41617	45980	23159	33789
1971-72	42219	25165	30923	47928	17001	39274	45423	23617	34071
1972-73	41431	26196	31612	42487	14201	34511	42054	23341	32820
1973-74	46190	26781	33440	38145	16257	32600	41007	24224	33059
1974-75	50673	27221	34940	39928	15586	33128	43[illegible]	[illegible]	34090
1975-76	49725	27932	3528	40704	19089	35068	43[illegible]	[illegible]	35253
1976-77	51763	26557	39160	38183	19888	32034	44[illegible]	22223	34099
1977-78	65220	34674	50047	38263	19729	32114	51710	27202	39522
1978-79	58017	33054	45035	37808	20213	29011	47413	26634	37273
1979-80	63410	34485	48647	37308	21163	29036	[illegible]	27804	39042
1980-81	71550	37455	47000	31487	21495	25996	[illegible]	[illegible]	[illegible]
1981-82	78774	39013	[illegible]	[illegible]	22029	[illegible]	[illegible]	[illegible]	[illegible]
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOURCE : Compiled and computed from the data given in the Annual Reports of the Bureau of Public Enterprises.

TABLE - 5.2

TRENDS IN CAPITAL OUTPUT RATIO in PUBLIC ENTERPRISES

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sector
1	2	3	4	5	6	7	8	9	10
1960-61	10.91	7.93	8.77	10.66	2.81	10.57	13.33	6.90	9.20
1961-62	10.39	7.99	8.80	20.02	2.83	10.92	13.52	6.89	9.34
1962-63	11.05	8.20	9.14	16.36	2.56	9.76	13.21	6.86	9.33
1963-64	10.88	8.26	9.4	14.82	2.58	9.69	12.65	6.95	9.32
1964-65	11.48	8.02	9.81	16.29	2.58	10.53	13.17	7.38	10.38
1965-66	11.35	8.83	9.72	16.64	2.73	10.76	13.81	7.26	10.88
1966-67	12.89	9.09	10.38	17.89	3.02	11.80	15.34	7.54	10.38
1967-68	13.23	9.36	10.70	17.22	3.35	11.93	15.29	7.81	11.16
1968-69	13.38	8.98	10.48	16.12	3.41	11.22	14.86	7.45	10.77
1969-70	13.86	8.90	10.59	14.92	2.81	10.01	14.17	6.97	10.34
1970-71	14.05	8.98	10.44	14.46	2.75	9.43	14.29	6.75	10.14
1971-72	14.50	8.80	10.75	15.16	2.61	9.36	14.88	6.44	10.10
1972-73	14.18	9.65	10.88	13.86	2.29	8.73	13.98	6.33	9.83
1973-74	10.02	9.61	11.86	12.42	2.84	8.33	13.65	6.61	9.96
1974-75	16.28	9.62	11.96	12.67	2.91	8.79	23.89	6.86	10.27
1975-76	15.81	9.09	11.44	12.53	3.07	8.68	13.64	6.57	9.96
1976-77	10.66	5.74	8.20	8.83	1.87	5.85	9.75	3.81	6.78
1977-78	11.94	7.17	9.55	8.34	1.82	5.78	10.14	4.50	7.32
1978-79	11.02	6.42	8.72	7.58	1.66	4.62	9.30	4.04	6.67
1979-80	11.32	6.56	8.94	6.75	1.53	4.14	9.04	4.05	6.65
1980-81	7.99	6.36	7.18	4.83	1.36	3.17	6.41	3.97	5.14
1981-82	10.76	5.92	8.35	5.10	1.26	3.19	7.84	3.60	5.77
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984-85	11.63	7.74	9.18	8.84	1.16	2.41	7.10	3.48	5.34
1985-86	9.4	6.85	7.71	8.64	1.17	2.71	6.37	3.38	5.02

SOURCE : Compiled and computed by the Research Scholar from Tables-1.1 and 2.1

The productivity is a measure of the efficiency of total factor resource which has been presented in the form of index in Table-6. Beginning with 1960-61 at 100, the total factor resource used in Public Enterprises increased year after year. In the first decade ending 1970-71 the total factor input, index stood at 192.18, registering an increase of 92.18 points over 1960-61. The subsequent period ending 1985-86, the index number soared to 623 or showing increase of 523 points over 1960-61. The two sectors have not used the same amount of factor input. In 1970-71 the index of the total factor input for commodity producing enterprises stood at higher level than that of tertiary sector. In the subsequent period ending 1985-86, more of factors inputs were used by commodity producing sector. Allocation of factor inputs between these two departments also show non-departmental enterprises using more factor input than the departmental enterprises; the index for the departmental enterprises consuming total factor input stood at 297 as compared with 982 for non-departmental enterprises. Table-6.1 brings out total factor productivity, revealing rising trend. However, it is worth noting that both, the index of net product and index of total factor productivity stood at the highest level for tertiary sector.

TABLE - 5

INDICES OF TOTAL FACTOR INPUT IN PUBLIC ENTERPRISES BY DEPARTMENTAL CATEGORIES & BROAD SECTORS

Years	Departmental Enterprises			Non-Departmental Enterprises			Total Public Enterprises		
	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors	Commodity Producing Sector	Tertiary Sector	All Sectors
1	2	3	4	5	6	7	8	9	10
1960-61	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1961-62	105.01	104.04	104.42	119.36	124.27	121.12	110.47	106.01	110.94
1962-63	112.10	110.26	111.01	147.38	135.48	146.39	125.39	112.83	118.67
1963-64	119.44	117.67	118.39	176.33	141.77	169.36	140.87	120.26	129.81
1964-65	128.90	124.48	126.14	195.80	169.66	190.24	154.57	133.31	142.64
1965-66	142.46	129.86	134.39	216.07	178.03	171.59	171.14	134.75	151.09
1966-67	141.60	132.90	137.15	239.51	190.97	231.73	181.76	138.74	158.94
1967-68	150.89	135.29	140.64	259.78	208.95	251.51	193.49	142.57	166.35
1968-69	158.56	137.89	143.46	279.40	234.18	271.47	202.40	146.97	172.92
1969-70	168.73	140.64	147.02	301.43	274.27	300.20	213.99	154.75	183.04
1970-71	160.91	145.77	152.13	326.22	313.83	327.61	228.51	160.22	192.18
1971-72	171.35	148.79	156.64	369.74	348.85	368.56	247.80	166.34	204.04
1972-73	184.84	150.97	161.67	433.22	386.58	428.19	280.34	173.05	221.85
1973-74	184.80	153.93	163.66	503.23	421.79	486.63	306.84	179.68	236.38
1974-75	194.39	158.25	166.42	524.37	437.19	520.24	314.73	180.00	244.09
1975-76	199.04	162.27	174.04	568.93	517.98	553.50	338.61	194.72	259.32
1976-77	193	188	216	615	564	599	409	318	374
1977-78	218	196	218	653	598	631	454	396	420
1978-79	264	200	234	725	621	673	497	411	454
1979-80	278	210	244	794	662	728	537	436	[illegible]
1980-81	291	217	254	878	703	840	585	419	530
1981-82	299	225	225	959	741	950	630	184	[illegible]
1982-83	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984-85	333	281	279	1055	778	918	711	167	571
1985-86	378	311	297	1113	829	981	756	500	629

Source : Derived by the researcher Scholar from Table-4.

Table-6.2 has been drawn up for the total factor productivity and net output in non-departmental enterprises. Both the indices reveal a rising trend. The trend in total factor productivity has not been as much accentuated as in net product. During 1960-61 and 1985-86 the index of net product increased to 2118 as compared with the index of total factor productivity standing at 313.

Table-6.3 presents the indices of net output and total factor productivity in Public Enterprises as a whole. The commodity producing sector reveal a higher level of net output and total factor productivity than the tertiary sector. In other words the performance of commodity producing sector is better than the tertiary sector.

Table-6.4 furnishes information about the productivity trends in departmental enterprises. In the first phase, 1960-61 to 1967-68, the commodity producing sector is more capital intensive than the tertiary sector. Total factor input is used more in commodity producing sector. Looking at the total factor productivity, the tertiary sector is found giving better performance. On average total factor productivity in the first phase was 0.27% per annum which tended to rise by 1.57% per annum till 1975-76. But during the subsequent period, 1975-76 to 1985-86, the total factor productivity declined by 1.25% per annum.

In non-departmental enterprises the over-all trend in total factor productivity is rising from period to period as depicted in Table-6.5. The Commodity Producing Enterprises has given better account of themselves than the tertiary. The table shows that labour is the major input, though Public Enterprises are capital intensive.

Table-6.6 depicts the trends in labour input, capital input, total factor input, total factor productivity and net product of Public Enterprises as a whole. The trend in total factor input for all Public Enterprises has been declining from sub-period to sub-period. The net product takes to a "U" course declining from 11.77% per annum to 8.74% per annum during the first two sub-periods and then rising to 11.65 per annum in the last sub-periods. The same is not true of the trends in total factor productivity which maintained a steady upward movement throughout the period. The trend in total factor input for Public Enterprises as a whole reveals two divergant patterns. The total factor input declined in the first two sub-periods then it rises. The trend in net product remains stagnant in the first sub-periods and rises in the last two sub-periods. Whereas the total factor productivity follows an inverted "∩" course. In the first two periods the total factor productivity shows a rising trend and declines in the last two sub-periods.

TABLE - 6.1

INDEX AS OF NET OUTPUT AND TOTAL FACTOR PRODUCTIVITY IN DEPARTMENTAL ENTERPRISES

Years	Commodity Producing Sector		Tertiary Sector		All Sectors	
	Index of Net Product	Index of Total Factor Productivity	Index of Net Product	Index of Total Factor Productivity	Index of Net Product	Index of Total Factor Productivity
1	2	3	4	5	6	7
1960-61	100.00	100.00	100.00	100.00	100.00	100.00
1961-62	111.18	105.88	106.25	102.12	107.85	103.28
1962-63	115.88	103.29	112.78	102.29	113.79	102.50
1963-64	130.00	108.84	123.01	104.54	125.29	105.83
1964-65	136.47	105.87	124.15	980.73	128.16	101.60
1965-66	152.35	106.94	134.09	103.26	140.04	104.20
1966-67	145.88	100.83	137.22	103.25	140.03	102.14
1967-68	152.35	100.97	139.20	102.89	143.49	101.88
1968-69	161.76	105.34	105.85	109.10	154.41	107.64
1969-70	167.06	105.25	156.53	111.30	159.96	108.80
1970-71	176.47	105.73	160.23	109.92	165.52	108.80
1971-72	182.94	106.78	170.17	114.37	174.33	112.01
1972-73	198.41	107.88	173.01	114.60	181.61	112.33

Table Contd....

1	2	3	4	5	6	7
1973-74	188.82	102.18	168.75	109.63	175.29	107.11
1974-75	195.88	108.23	175.28	110.74	181.99	109.36
1975-76	215.29	108.16	193.75	119.40	200.77	115.36
1976-77	388	160.00	347	184	368	172
1977-78	374	152.00	350	188	368	170
1978-79	386	144.00	379	190	383	117
1979-80	250	90.00	215	102	233	96
1980-81	348	120.00	326	150	337	135
1981-82	331	146.00	339	150	335	148
1982-83	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA
1984-85	372	116.00	334	142	353	129
1985-86	535	156.00	422	168	476	162

SOURCE : Compiled and computed by the Research Scholar from Tables-1.1 and 6.

TABLE - 6.2

INDEXES OF NET OUTPUT AND TOTAL FACTOR PRODUCTIVITY IN NON-DEPARTMENTAL ENTERPRISES

Years	Commodity Producing Sector		Tertiary Sector		All Sectors	
	Index of Net Product	Index of Total Factor Productivity	Index of Net Product	Index of Total Factor Productivity	Index of Net Product	Index of Total Factor Productivity
1	2	3	4	5	6	7
1960-61	100.00	100.00	100.00	100.00	100.00	100.00
1961-62	119.73	100.31	115.73	93.13	117.58	97.08
1962-63	177.63	120.53	139.33	102.84	156.97	107.99
1963-64	236.84	134.32	146.07	103.03	187.89	110.94
1964-65	253.95	129.65	157.30	98.52	201.82	106.09
1965-66	294.74	136.41	184.27	103.51	235.15	111.66
1966-67	314.47	131.28	186.52	97.67	245.45	105.92
1967-68	364.47	140.30	192.13	91.95	271.52	107.96
1968-69	423.68	151.64	226.97	96.92	317.58	116.99
1969-70	494.74	164.15	287.64	104.87	383.03	127.59
1970-71	551.52	169.00	353.93	112.78	444.85	135.79
1971-72	368.42	153.74	416.85	119.49	456.67	132.05

(Table Contd..)

1.	2.	3	4	5	6	7
1972-73	675.00	155.81	468.43	118.59	558.18	130.36
1973-74	814.47	161.65	492.13	116.68	640.61	131.64
1974-75	857.89	163.60	483.15	99.17	655.76	126.04
1975-76	944.74	167.83	552.81	106.72	733.33	132.49
1976-77	1693	275	1137	201	1415	138
1977-78	1855	279	1196	204	1526	242
1978-79	2182	300	1351	217	1767	259
1979-80	2658	334	1578	238	2118	286
1980-81	2341	405	1333	190	1337	298
1981-82	2614	272	1428	193	2021	233
1982-83	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA
1984-85	2996	283	1567	201	2282	242
1985-86	4216	368	2115	257	2118	313

SOURCE : Derived by the Research Scholar from Table 6.1

TABLE - 6.3

INDEX OF NET OUTPUT AND TOTAL FACTOR PRODUCTIVITY IN PUBLIC ENTERPRISES

Years	Commodity Producing Sector		Tertiary Sector		All Sectors	
	Index of Net Product	Index of Total Factor Productivity	Index of Net Product	Index of Total Factor Productivity	Index of Net Product	Index of Total Factor Productivity
1	2	3	4	5	6	7
1960-61	100.00	100.00	100.00	100.00	100.00	100.00
1961-62	113.82	103.03	108.16	102.03	110.19	99.32
1962-63	134.96	107.63	118.14	104.71	124.16	100.63
1963-64	163.01	115.72	127.66	106.15	140.32	108.10
1964-65	172.76	111.77	130.34	101.97	146.85	103.70
1965-66	196.34	114.52	144.22	107.03	162.88	107.16
1966-67	197.97	108.92	147.17	106.08	165.36	104.04
1967-68	217.89	112.61	149.89	105.13	174.24	104.74
1968-69	242.68	119.85	166.21	113.09	193.60	111.96
1969-70	268.29	125.38	182.99	119.02	213.54	117.30
1970-71	292.28	127.91	199.32	124.40	232.61	121.04
1971-72	302.03	121.88	219.95	132.23	249.34	122.20

(Table Contd..)

1	2	3	4	5	6	7
1972-73	346.34	123.54	230.61	133.76	272.05	122.63
1973-74	382.11	124.53	234.01	130.97	287.05	121.44
1974-75	400.41	127.22	237.41	125.61	295.78	120.19
1975-76	440.65	130.13	266.21	136.71	328.68	126.63
1976-77	1040	218	742	193	891	206
1977-78	1115	216	773	196	944	206
1978-79	1284	2223	865	204	1075	213
1979-80	1454	212	897	170	1176	191
1980-81	1345	263	829	170	1087	216
1981-82	1473	209	884	172	1179	191
1982-83	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA
1984-85	1684	200	951	172	1318	186
1985-86	2376	262	1268	213	1822	237

SOURCE : Derived by the Research Scholar from Table-6.1

TABLE - 6.4

GROWTH RATES OF INPUTS AND OUTPUTS IN PUBLIC ENTERPRISES BY DEPARTMENTAL ENTERPRISES/BROAD SECTOR

Sector/Aggregate	1960-61 to 1967-68	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 1985-86
Commodity Producing Sector :				
Labour Input	3.48	1.28	0.01	1.1[illegible]
Capital Input	9.75	6.78	7.4	[illegible].8
Total Factor Input	6.05	3.52	3.71	4.4[illegible]
Total Factor Productivity	0.14	0.86	(-)9.50	0.0[illegible]
Net Product	6.20	4.42	4.8	4.8
Tertiary Sector :				
Labour Input	2.61	1.45	0.033	1.0[illegible]
Capital Input	7.35	3.84	6.80	[illegible].1[illegible]
Total Factor Input	4.41	2.30	3.42	3.5[illegible]
Total Factor Productivity	0.41	1.88	(-)2.00	2.8[illegible]
Net Product	4.84	4.22	2.60	3.60
All Sectors :				
Labour Input	2.90	1.39	0.028	1.09
Capital Input	8.33	5.16	7.10	7.00
Total Factor Input	5.01	2.68	3.56	4.05
Total Factor Productivity	0.27	1.57	(-)1.25	1.29
Net Product	5.29	4.29	3.70	4.29

SOURCE : Compiled and computed by the Research Scholar from Tables 1.2, 3.1, 6 and 6.1

TABLE - 6.5

GROWTH RATES OF INPUTS AND OUTPUT IN PUBLIC ENTERPRISES BY NON-DEPARTMENTAL ENTERPRISES

(% per annum)

Sector/Aggregate	1960-61 to 1962-63	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 85-
Commodity Producing Sector :				
Labour Input	.01	11.25	10.5	11.05
Capital Input	18.61	8.25	10.9	11.80
Total Factor Input	14.61	10.15	10.7	11.45
Total Factor Productivity	4.96	2.27	4.2	13.85
Net Product	20.29	12.04	18.6	17.3
Tertiary Sector :				
Labour Input	10.03	11.45	3.8	7.29
Capital Input	12.55	12.88	7.1	10.3
Total Factor Productivity(-)	1.19	1.88	3.4	1.92
Total Factor Input	11.10	12.02	5.45	8.52
Net Product	9.78	14.12	10.75	11.41
All Sectors :				
Labour Input	11.47	11.30	7.14	9.17
Capital Input	17.34	8.82	10.50	10.90
Total Factor Productivity	1.10	2.59	3.8	2.85
Total Factor Input	14.08	10.36	8.82	10.45
Net Product	15.34	13.22	14.67	14.44

SOURCE : Compiled and Computed by the Research Scholar from Tables-1.2,3.1,6 and 6.2

TABLE - 6.6

GROWTH RATES OF INPUTS AND OUTPUTS IN PUBLIC ENTERPRISES BY TOTAL: PUBLIC ENTERPRISES

(% per annum)

Sectors/Aggregate	1960-61 to 1967-68	1967-68 to 1975-76	1975-76 to 1985-86	1960-61 to 1985-86
Commodity Producing Sector :				
Labour Input	.85	6.80	5.26	6.11
Capital Input	13.98	7.65	8.95	9.80
Total Factor Input	7.89	7.25	7.20	7.97
Net Product	11.77	8.74	11.65	11.14
Tertiary Sector				
Labour Input	3.45	3.76	1.92	4.15
Capital Input	7.84	5.15	6.95	8.05
Total Factor Input	5.20	3.97	4.44	6.05
Total Factor Productivity	0.72	3.34	0.70	2.38
Net Product	5.95	7.44	6.73	7.50
All Sectors :				
Labour Input	4.91	5.05	3.59	5.13
Capital Input	11.28	6.73	7.95	8.93
Total Factor Input	7.54	5.72	5.82	7.01
Total Factor Productivity	6.66	2.40	1.28	2.16
Net Product	8.26	8.26	9.19	9.32

SOURCE : Derived by the Research Scholar from Table-6.5

C O N C L U S I O N

It follows from the above that the contribution of Public Sector to national product has vastly increased during the period of study; the average rate of growth in its contribution to Net Domestic Product is 8.53% during the period of study. The study reveals that commodity producing enterprises contributed 55% of the total public sector's share in net domestic products. Large capital formation and more employment of labour, among other things, are the factors responsible for expanding share of public sector in the domestic product. For instance, the net capital stock increased from Rs. 6322 crores in 1960-61 to Rs. 40262 crores in 1985-86. The public sector employed 92 lakhs of workers in 1985-86.

The departmental enterprises employed more workers. It is also worth citing that 63% of the workers were employed in commodity producing enterprises of non-departmental sector. The non-departmental enterprises especially the commodity producing sector held most of the capital. In Public Sector as a whole, capital-labour ratio registered rapid growth from Rs. 2055 in 1960-61 to Rs. 40,891 in 1985-86. High Capital-labour ratio is because of high degree of technology used in public sector enterprises.

The study reveals two distinct trends in capital productivity; initially it had a rising trend till 1975-76 and subsequently it declined during 1975-76 to 1985-86.

The total factor productivity is affected by the divergent trends in capital and labour productivity. The total factor productivity follows the "∩" course e.g. rising initially because of more than proportionate increase in net product than in factor input and vice-versa when the total factor productivity declined.

CHAPTER - VI

PRODUCTIVITY TREND IN PUBLIC SECTOR STEEL INDUSTRY

In the preceding Chapter-V, it has been observed that the productivity trend in Public Enterprises has been unsteady during the period under review. In other words, it may be said that physical resources have not been used effectively by them. The present Chapter-VI is concerned with the analysis of productivity trend in Iron and Steel Industries during the period 1960-61 to 1985-86.

Public Sector Steel Industry comprises of the Steel Plants of SAIL, IISCO, SPONGE IRON STEEL. The productivity has been measured in the following framework :-

$$G_P = F(G_K, G_L, G_A)$$

Where G_P, G_K, G_L and G_A denote productivity trend capital productivity, labour productiviry and the total factor productivity respectively.

As a first step towards the assessment of productivity trend, I have prepared Table-1 to estimate value added of the steel group in Public Sector for 26 years from 1960-61 to 1985-86. The value added was Rs. 9 crores in the bench

mark year 1960-61 which kept rising every year. The total period has been divided into five-sub-periods. In the initial sub-period 1960-61 to 1964-65, the value added increased five-folds. The second sub-period has been characterised by substantial increase in the value added from Rs. 45 crores to Rs. 94 crores. The third terminal year, 1974-75 was also the period of further significant increase in the value-added. In the final terminal year 1985-86 the value-added stood at Rs. 751 crores. These data have been used by me to compute trend in value-added of the steel group of Public Sector in terms of annual average for the five sub-periods and also for the whole period 1960-61 to 1985-86. The value-added increased at the rate of 80% per annum in the first sub-period ending 1964-65. This rate could not be maintained by the steel groups of Public Sector in the subsequent period. The growth rate of value added in the sub-period 1964-65 to 1969-70 was 21.8% per annum. However, there was marginal improvement in the trend in third sub-period, 1969-70 to 1974-75. The fourth sub-period 1974-75 to 1979-80 was also the period of stagnant growth. In the fifth sub-period 1979-80 to 1985-86 the growth had decelerated at the rate of 20% per annum. The annual average growth rate of value added for the whole period was 33.21%.

TABLE - 1

VALUE-ADDED OF STEEL GROUP (AT CURRENT PRICES)

(Rs. in Crores)

Years	Value-Added
1960-61	9
1961-62	17
1962-63	26
1963-64	35
1964-65	45
1965-66	54
1966-67	63
1967-68	76
1968-69	89
1969-70	94
1970-71	104
1971-72	114
1972-73	125
1973-74	136
1974-75	197
1975-76	240
1976-77	310
1977-78	443
1978-79	390
1979-80	416
1980-81	500
1981-82	574
1982-83	NA
1983-84	NA
1984-85	632
1985-86	751

SOURCE : Survey Report on Public Enterprises (For various years) BPE, Ministry of Finance, New Delhi and Economic Times Surveys for 1984-85 and 1985-86.

It is worth mentioning that the steel group of the Public Sector occupies leading position in the Public Sector as a whole for highest trend in value-added; the Public Sector Enterprises as a whole with growth rate of 8.53% per annum (Table-1.2) lags far behind the steel group which attained the growth rate of 33%. The reason for a very high growth of the value-added of steel group in comparison to all the Public Sector Enterprises is that the steel industry is fast expanding.

The growth of value added is the function of capital stock and the capital formation. The capital stock in steel group consists of the gross block, that is, the productive capital invested in plant and building.

TABLE - 2

TREND IN VALUE-ADDED IN STEEL GROUP

Years	% Per annum
1960-61 to 1964-65	80.0
1964-65 to 1969-70	21.8
1969-70 to 1974-75	21.91
1974-75 to 1979-80	22.23
1979-80 to 1985-86	20.12
1960-61 to 1985-86	33.21

SOURCE : Derived by the Research Scholar from Table-1.

TABLE - 3

CAPITAL FORMATION OF STEEL GROUP

(Rs. in Crores)

Years	Capital Stock	Capital Formation
1960-61	1060	10
1961-62	1070	10
1962-63	1081	11
1963-64	1100	19
1964-65	1115	15
1965-66	1123	08
1966-67	1130	07
1967-68	1144	14
1968-69	1162	18
1969-70	1174	12
1970-71	1186	12
1971-72	1193	07
1972-73	1208	15
1973-74	1223	15
1974-75	1515	292
1975-76	1805	290
1976-77	2100	295
1977-78	2390	290
1978-79	2681	291
1979-80	2856	175
1980-81	3086	230
1981-82	3256	170
1982-83	NA	NA
1983-84	NA	NA
1984-85	3336	80
1985-86	3512	176

SOURCE : Survey Report of various years, Opcit and Economic Times Surveys for 1984-85 and 1985-86.

These two components of the fixed capital have been estimated by me to find out as to what contribution they make to the value added for the income accruing to them in terms of rent interest and profit. The basic data of capital stock and capital formation have been furnished in Table-3 which covers the period of 26 years, ending 1985-86. In the initial year, 1960-61, the capital stock was Rs. 1060 crores, with capital formation of Rs. 10 crores. A cursory look at the table-3 would suggest the capital stock cumulating every year. Taking for comparative study, the terminal years of each sub-periods, a substantial increase in the capital stock is found.

For instance in 1964-65 the capital stock was Rs.1115 crores, as against Rs. 1060 crores in 1960-61. The capital stock was substantially large in 1969-70—Rs. 1174 crores. There was further increase in the capital stock in 1974-75. In the last year 1985-86, the capital stock was Rs. 3512 crores with capital formation of Rs. 176 crores.

The trend in the growth of capital stock of steel group as revealed by Table-4 has been rising significantly every subsequent sub-period. The growth rate of capital stock of initial sub-period 1960-61 to 1985-86 was 1.04% per annum, probably owing to lack of any new investment

project in steel group. In the subsequent sub-periods ending 1969-70 there was no change in the growth rate. The growth rate, however, took a leap forward in the third sub-period 1969-70 to 1974-75 (5.80% per annum). The zenith of trend in growth rate was 17.70% per annum in the sub-period 1974-75 to 1979-80. In the last sub-periods ending 1985-86, there was a steep decline to 5.70% per annum in the growth rate of capital stock of steel group. The annual average growth rate for the whole period 1960-61 to 1985-86 was 6.27% per annum.

The steel group though heavily capital intensive industry has indeed expanded at a lower rate than all the Public Enterprises as suggested by 9% per annum of growth rate of capital stock in them (vide Table No. 2.2).

TABLE - 4

TREND IN GROWTH RATES OF CAPITAL STOCK OF STEEL GROUP

Years	% per annum
1960-61 to 1964-65	1.04
1964-65 to 1969-70	1.06
1969-70 to 1974-75	5.80
1974-75 to 1979-80	17.70
1979-80 to 1985-86	5.7
1960-61 to 1985-86	6.27

SOURCE : Table-3 Op Cit.

The second major input in the steel production process of the Public Sector steel group consists of labour. Table-5 has been drawn up to furnish information about the number of workers value added and value added per worker for the whole period of 26 years beginning with 1960-61. Initially 91,008 workers were employed excluding the casual workers. The number of workers employed in Public Sectors Steel Plants increased from year to year as a matter of the national policy to remove unemployment. In the terminal year of the first period 153,410 workers were employed which increased to 159130 in the terminal year of the subsequent sup-period. In the final year of the third sub-period 1975-76 the number of workers further increased to 155.00. In the end of the whole period 1985-86 number of workers was as large as 248,443.

In Table-5 I have estimated the labour productivity in terms of value-added per-workers increased from Rs. 1000 in 1960-61 to Rs. 2,941 in 1964-65, to Rs. 5,912 in 1969-70 to Rs. 12,628 in 1974-75 to Rs. 21,895 in 1979-80 and finally to Rs. 30,040 in 1985-86. The higher labour productivity in the steel group of the Public Sector stuns from, in the first instance disparate trends in growth of employment and value-added. Value-added per-worker has increased because of more increase in value-added than in employment.

Table-6 estimates the growth rates of employment in steel group for each sub-period and for the whole period as well. Employment has grown at the highest rate in the initial period———13.07% per annum, largely because of establishment of new steel plants in the Steel Public Sector. The rate declined heavily to 0.75% per annum, and in the subsequent sub-period the growth rate was negative, indicating decline in the number of workers. In 1974-75 to 1979-80, more employment was provided by the steel group at rate 4.54% per annum. The growth rate further increased to 7.34% in the last sub-period ending 1985-86. The average annual growth rate for the whole period was 5.02% per annum.

The overall efficiency of inputs depend on technological improvement. The capital intensity is a comprehensive indicator of the extent of technology used in the

TABLE - 5

LABOUR PRODUCTIVITY

(Rs. In Crores)

Years	Number of Workers	Value added	Labour Productivity
1960-61	91008	9	1000
1961-62	99705	17	1717
1962-63	138637	26	1884
1963-64	138681	35	2518
1964-65	153410	45	2941
1965-66	149531	54	3704
1966-67	145852	63	4315
1967-68	146929	76	5170
1968-69	150234	89	5933
1969-70	159130	94	5912
1970-71	158530	104	6582
1971-72	15800	114	7215
1972-73	157400	125	7925
1973-74	156900	136	8668
1974-75	156450	197	12628
1975-76	155000	240	15484
1976-77	154300	510	33117
1977-78	153400	443	28875
1978-79	153774	390	25490
1979-80	192000	416	21695
1980-81	230362	500	21739
1981-82	235223	574	24956
1982-83	NA	NA	NA
1983-84	NA	NA	NA
1984-85	247974	632	25280
1985-86	248443	751	30040

SOURCE : Survey Report on Public Enterprises (for various years) B.P.E. Ministry of Finance, New Delhi.

TABLE - 6

GROWTH RATES OF EMPLOYMENT IN STEEL GROUP

Years	% Per annum
1960-61 to 1964-65	13.70
1964-65 to 1969-70	0.75
1969-70 to 1974-75	(-) 0.33
1974-75 to 1979-80	4.54
1979-80 to 1984-85	7.34
1960-61 to 1985-86	5.20

SOURCE : Table-5 Op Cit.

production process of an enterprise. Higher labour productivity is according to my contention, is the fruit of capital intensive nature of these enterprises.

Table-7 furnishes the facts of analysis. The capital intensity has not followed any set pattern. In the initial year of the period under review 1960-61 when the steel plants were largely newly established and the number of workers was minimum, the productive capital per-worker was highest Rs. 1,17,773.00. Since capital formation in steel

TABLE - 7

CAPITAL INTENSITY OF STEEL GROUP

(Rs. in Crores)

Years	Capital Stock	No. of Workers	Capital Intensity
1960-61	1060	91008	117778
1961-62	1070	99705	118880
1962-63	1081	138637	77214
1963-64	1900	138681	78571
1964-65	1115	153410	74333
1965-66	1123	149531	802114
1966-67	1130	145852	75333
1967-68	1144	146929	76267
1968-69	1162	150234	77467
1969-70	1174	159130	73375
1970-71	1186	158550	74125
1971-72	1193	158000	74563
1972-73	1208	157400	75500
1973-74	1223	156900	78397
1974-75	1515	156480	94688
1975-76	1805	155000	112812
1976-77	2100	154300	140000
1977-78	2390	153400	159333
1978-79	2681	153774	178733
1979-80	2856	192008	150315
1980-81	3086	230362	134174
1981-82	3256	235228	135667
1982-83	NA	NA	NA
1983-84	NA	NA	NA
1984-85	3336	247974	133440
1985-86	3512	248443	140480

SOURCE : Tables 3 and 5 op-cit.

group could not keep pace with the growth rate of employment. As a matter of national employment policy, capital per-worker in the terminal year of the second sub-period 1970-71 was Rs. 74,125/-. The subsequent sub-period witnessed significant increase in the capital intensity to Rs. 1,12,812/- as a consequence of new steel projects at Visakhapatnam. Subsequently there was steep deceleration in the programme of capital formation which brought down the capital intensity to Rs. 1,40,480 in 1985-86.

The contribution of capital over the period under review to the value added has been measured in terms of value-added per unit of capital used by the steel group in production. The trends in capital have been estimated in Table-3. The trend is slow but steady in its upward movement. In 1960-61 value-added constituted just 0.80%, largely because of idle capacity. The capital productivity improved substantially by the end of the terminal year of the subsequent period 1969-70-8%. In 1975-76 more intensive use of the productive capacity in steel group yielded higher capital productivity that is 13.25%. There was significant increase in the capital productivity by the end of the period 1985-86 (21 %).

The inescapable inference to be drawn from the analysis of Table-3 is that the value added increased at a faster rate than the capital stock. It is worth citing that the last

capitals created in steel group of Public Enterprises made a favourable impact on higher capital productivity in subsequent years as evident from the higher capital productivity of the steel group than that of the Public Enterprises as a whole (5.09%) vide Table-5.2).

TABLE - 8

CAPITAL PRODUCTIVITY OF STEEL GROUP (GROSS BLOCK)

Years	Capital Stock	Value added	Capital Productivity
1960-61	1060	9	0.80
1961-62	1070	17.0	1.59
1972-63	1081	26.0	2.40
1963-64	1100	35.00	3.15
1964-65	1115	45	4.01
1965-66	1123	54	4.76
1966-67	1130	63	5.56
1967-68	1144	76	6.25
1968-69	1162	89	7.04
1969-70	1174	94	8.00
1970-71	1186	104	8.75
1971-72	1193	114	9.55
1972-73	125	125	10.33
1973-74	1223	136	13.00
1974-75	1515	197	13.00
1975-76	1905	240	13.25
1976-77	2100	510	14.00
1977-78	2390	443	14.60
1978-79	2681	390	15.00
1979-80	2856	416	15.00
1980-81	3086	500	16
1981-82	3236	574	18
1982-83	NA	NA	NA
1983-84	NA	NA	NA
1984-85	3336	632	19
1985-86	3512	751	21

SOURCE : Compiled and computed by the Research Scholar from tables 1 and 3.

TABLE - 9

TOTAL FACTORS PRODUCTIVITY IN STEEL GROUP

Years	Value Added Index	Labour Index Input	Capital Index Input	Total Input Index	Total Factor Productivity
1960-61	100	100	100	100	100
1961-62	188	109	101	105	148
1962-63	288	152	102	127	226
1963-64	388	152	104	128	303
1964-65	500	164	105	135	370
1965-66	600	160	106	133	451
1966-67	700	161	107	134	522
1967-68	844	161	108	135	625
1968-69	988	165	109	138	715
1969-70	1044	175	110	143	730
1970-71	1155	174	112	143	807
1971-72	1266	173	113	143	885
1972-73	1388	172	114	143	970
1973-74	1511	172	115	158	1044
1974-75	2188	172	143	158	1385
1975-76	2666	170	170	1708	1568
1976-77	5666	169	198	184	3079
1977-78	4922	168	225	197	2498
1978-79	4333	210	253	232	1867
1979-80	4622	212	269	241	1918
1980-81	5555	253	291	272	2042
1981-82	6377	258	307	283	2253
1982-83	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA
1984-85	7022	272	314	293	2396
1985-86	8344	273	331	302	2762

SOURCE : Compiled and computed by the Research Scholar from Tables 1, 5 and 3.

Finally I have estimated the overall efficiency of steel enterprises in Table-9 which presents the total factor productivity. I have prepared indices of value added, labour input and capital input. The average index of labour and capital inputs is given in column number 5 of table-9. The total factor productivity is the average derived by dividing the value added index (column 2 with total input index (column-5). The total factor productivity displays upward trend. The total factor productivity is 28 times that of 1960-61.

In Table-10 disparate trends in growth rates of the inputs, total factor productivity and value added are discernible. The sub-period classification of the general trend in factor productivity indicates an upward movement. The additional labour input has been used at the rate of 3.7% per annum in the initial sub-period 1960-61 to 1964-65. The rate had decelerated in the subsequent sub-period so much so that it was negative in the third sub-period in 1974-75. The trend began to search in the periods ending 1979-80 and 1985-86. The general rate of consumption of labour input in the steel group of enterprises of the public sector for whole period was 5.2% per annum. The capital input was increased at a lower rate in the initial sub-period 1.04%

per annum. It continued to travel upward in all the subsequent sub-periods till 1979-80 the growth rate being 17.70% per annum which declined to 5.7% in the forthcoming sub-periods 1979-80 to 1985-86. The average rate of consumption of capital input in steel enterprises for the whole period 1960-61 to 1985-86 was 6.2% per annum higher than the labour input. Growth rates of total factor inputs indicate the additional amount of consumption of total factor inputs. The growth of total factor input in steel industry has been constant 1974-75 at 2.74% per annum. In 1974-75 total factor inputs were increasingly used. The average growth rate of factor input for the whole period was 5.74% per annum. The total factor productivity had increased at a phenomenal rate in the initial sub-period 1960-61 to 1964-65 64% per annum, after which it continued to decline till 1979-80. The average trend in total factor productivity was 22% per annum. The value-added has increased at substantially high rate at the initial period—80% per annum. The growth of value added decelerated in subsequent periods, ranging from 20% to 22% . The average growth for the whole period was 32% per annum.

The conclusion to be drawn from the analysis of Table-10 is that the labour efficiency increased in the wake of greater capital intensity. The Steel Group of enterprises gave a better account of performance in comparison to all public

TABLE - 10

GROWTH RATES OF NET OUTPUT FACTOR INPUTS AND TOTAL FACTOR PRODUCTIVITY IN STEEL GROUP

(% Per annum)

Steel Group	1960-61 to 1964-65	64-66 to 69-70	69-70 to 74-75	74-75 to 79-80	79-80 to 85-86	60-61 to 85-86
Labour Input	13.70	0.70	(-) 0.33	4.54	7.34	5.20
Capital Input	1.04	1.06	5.80	17.70	5.7	6.27
Total Factor Input.	2.37	0.91	2.74	11.12	6.52	5.74
Total Factor Productivity	54.00	19.5	17.9	7.6	11.00	22.00
Value Added	80.00	21.3	21.91	22.23	20.13	33.21

SOURCE : Derived by the Research Scholar from Tables 2, 4, 6 and 9.

Enterprises taken together 2.16 % per annum (Table-6.6) for Public Sector Enterprises as against 22% for Steel Group of Public Enterprises.

MEASUREMENT OF PRODUCTIVITY TRENDS IN INDIAN STEEL INDUSTRY

The Steel Industry as a whole deserves special attention of the Research Scholar for further probe into the productivity trend since the previous analysis was confined to public sector steel group of enterprises. The Steel Industry consists of 167 units. The previous study covered five integrated steel mills. It is, therefore, necessary for me to analyse the productivity of the Industry as a whole.

I have measured productivity trends of capital in terms of the following ratio :-

(1) Income per-unit of capital which comprises sales process, the changes in closing stock and income from other investment, viz. bank deposits etc.

(2) Value-added per-unit of capital which implies the volume of gross output minus the cost of material, fuel and power etc.

(3) Output per-unit of capital (capital productivity).

The labour productivity has been measured by the Research Scholar with the help of the following ratios:-

1. Income per-worker
2. Value-added per-worker
3. Output (tonne per worker)

Capital Productivity :

Table-11 presents changes in the capital during the period under review. The table has been drawn up to estimate capital intensity for the purpose of pointing out the technical changes and their impact on production.

TABLE - 11

CAPITAL INTENSITY IN INDIAN STEEL INDUSTRY

Years	(Rs. Per Worker *[2] at Current Prices) Gross Fixed Capital	Net Fixed Capital	
1960	15029	14028	
1961	13959	13624	
1962	33399	31398	
1963	37309	34974	
1964	34760	32409	
1965	37801	34837	
1966	42906	39885	
1967	49119	45522	
1968	49676	45859	
1969	46291	42336	
1970-77	112000	101000	*b
1978-79	177852	160081	
1979-80	179577	161610	
1980-81	229620	157357	
1981-82	210080	148349	
1982-83	NA	NA	
1983-84	NA	NA	
1984-85	198260	153539	
1985-86	204384	153082	

SOURCE :1) Compiled and computed by the Research Scholar from data presented in Census of Manufacturing Industries (CMI) and Annual Survey Reports (ASI)
2) Data from 1978-79 1985-86 had been compiled by RS from differe BPE's Reports & the Economic Times Surveys.

It is evident from the Table-11 that there is vast increase in capital intensity especially since 1962. The capital per-worker went up from Rs. 15029 in 1960 to Rs.49676 in 1969 and to Rs. 204384 in 1985-86. The annual average rate of growth for the period 1960 to 1985-86. comes to about 54% in the case of gross fixed-capital and 41% in the case of net fixed-capital. It is a considerable growth of capital intensity in Ironaand Steel Industry in an economy suffering from paucity of capital resources. The high growth rate of capital intensity is not free from problems for the Industry as well as for the economy. The technical progress will be advantageous if there is increase in capital productivity.

Increase in capital intensity since 1960 is mainly due to the establishment of major steel mills in the public sector and large scale programme of expansion and modernisation of the existing private sector mills. Apart from the establishment of three public sector steel mills, the alloy steel plants in public sector in 1965 also contributed to capital intensity significantly. The increase in capital intensity does not imply in the case of India substitution for labour for capital. However, such a substitution cannot be ignored in the future. The growing need for more jobs may lead to a policy of less use of capital input for labour input.

The ratios of capital productivity have been shown in Table-12. There are certain limitations of data, which, however, do not seriously affect the results. I have used average ratios in place of marginal ratios, though marginal productivity of capital is usually estimated for investment planning. The marginal productivity of capital is doubtlessly of limited use for the purpose of the present study. The average capital output ratio is concerned with the existing total stock of capital to the total output, and marginal ratios shows the addition of the stock of capital in comparison with the addition to total output (other things being same). Since other factors are not constant in this study, the output measured is not a return to the capital but addition to output with a given stock of capital. Therefore, average ratios are taken as rough approximation to marginal ratios.

It is felt by me as unnecessary to compare average ratios with the rate of interest in the capital market because these ratios are not the same as return from capital in the sense in which profitability concept is used. From Table-12, it is clear that the trends in the ratios of output to capital is characterised by a general stable trend barring the first couple of years that is 1960 and 61 which has marked declining trend. In the years, 1960

TABLE - 12

CAPITAL (FIXED) PRODUCTIVITY IN INDIAN STEEL INDUSTRY
(At Current Prices)

Years	Gross Income to Gross Capital fixed	Net Income to net capital fixed%	Gross Value added to capital fixed%	Net Value added to net capital fixed%	Gross Capital fixed per tonne of steel Ingot %	Net Capital fixed per tonne of steel Ingot % *
1	2	3	4	5	6	7
1960	119.6	119.6	36.6	32.1	615.6	574.6
1961	127.5	130.5	47.7	38.9	505.6	457.2
1962	56.8	53.2	20.1	13.4	1344.1	1241.3
1963	63.3	60.9	21.8	16.6	1338.9	1255.1
1964	71.5	69.4	25.8	20.6	1336.5	1248.5
1965-	71.2	66.7	26.0	19.7	1332.5	1228.0
1966	67.0	64.5	22.7	16.8	1456.5	1353.9
1967	59.3	56.2	18.3	12.0	1749.3	1624.8
1968	67.0	64.3	20.9	14.3	1749.2	1614.7
1969	76.6	74.4	24.0	16.6	1742.0	1594.0
1970-70**	67.8	80.2	23.5	18.5	36524	3240
1980-81	59.0	86	23	20.1	71304.23	4886.44
1981-82	65.0	92	24.5	21.5	7031.14	4965.10
1982-83	NA	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA	NA
1984-85	58	74	26.0	24.0	8398.84	6504.35
1985-86	62.5	83	25.0	23.0	7714.32	5734.72

SOURCE : Compiled and computed from BPE's Annual Reports and the Economic Times Surveys for 1984-85 to 1985-86

* Output (Steel Ingot) used in this table refer to production date reported in MSL Statistics for Iron & Steel Industry in India, whereas all other items refer to CMI, ASI and BPE.

** Figures show annual average for the period 1970-71.

the Iron and Steel Industry including the existing private mills undertook a large scale expansion programme. The capacities of TISCO and IISCO were raised substantially as a part of large scale increase in steel capacity projected under the second plan.

The vast expansion in investment was not matched by increase in output. Therefore, the investment output lag could be a probability for the decling output ratio during these two years.

The sixties are marked by a lower productivity ratio mainly due to newly established major plants of Bhilai, Durgapur and Rourkela in the public sector. The public sector steel plants involved higher capital requirements per tonne of end-products. Thus, upward trend in the ratio 1962 and 1965 is the result of operations of the new public sector plants at either full or near full capacities. The subsequent years witnessed industrial recession which was reflected in the low capacities utilisation and a fall in capital output ratio. Besides, additional capital was invested in the Industry for expansion in capacity which was not matched by increase in output during the immediately following years. Consequently the capital output was low in the sixties. The four years of eighties are marked by

a generally stable trend. This period has witnessed that ratios of net income to net capital was higher than the ratio of gross income to gross capital. But the same is not true of the ratio of value added to capital. The ratio of gross value added to gross capital is higher during 1980-81, 1984-85 and 1985-86. This indicates impacts of higher rate of capital consumption in eighties than in the preceding years. There is likely to be some divergence between two ratios with the progression of the time and higher rate of depreciation.

The foregoing analysis conclusively indicates that average productivity of capital in Iron and Steel Industry would be in the neighbourhood of the values yielded during 1981-82. When the Industry operated at its full or near full capacity. The conclusion is premised on a given price structure of steel products quality of material inputs, transportation cost etc.

LABOUR PRODUCTIVITY

The labour productivity is presented in Table-13. Over a period of 26 years, all the ratios have increased significantly. The increase has been considerably higher in value measures than the physical ones. The estimated

TABLE - 13

LABOUR PRODUCTIVITY IN INDIAN STEEL INDUSTRY (AT ALL CURRENT PRICES)

Years	Gross Income per-worker (Rs. 80%)	Net Income per-worker (Rs.80%)	Gross Value Added per-worker (Rs.)	Net Value Added per-worker (Rs.)	Output per unit of labour (Tonnes of Ingot) Per-worker
1	2	3	4	5	6
1960	17826.0	16827.0	5512.3	4512.4	24.41
1961	17810.5	16475.4	6248.6	4913.6	27.61
1962	19330.7	16729.9	6838.2	4237.4	25.29
1963	23665.9	21310.4	8146.6	5811.0	27.86
1964	24854.3	22563.3	8998.1	6707.2	26.01
1965	26021.6	23951.1	9843.6	6879.9	28.37
1966	28772.6	25749.6	9744.3	6722.3	29.46
1967	29166.8	25669	3998.7	5501.6	28.08
1968	33327.7	29511.2	10416.2	6599.8	28.40
1969	35487.9	31532.7	11133.3	7096.4	26.56

(Table Contd...)

1	2	3	4	5	6
1970-79*[b]	114717	92739	24239	15218	29.5
1980-81	193945	153945	37344	23340	32.2
1981-82	175930	135930	46462	25675	29.2
1982-83	NA	NA	NA	NA	NA
1983-84	NA	NA	NA	NA	NA
1984-85	152897	112897	54938	39242	23.8
1985-86	174257	123877	46248	29419	28.8

SOURCE : Data from 1960 to 1979 have been based on MSL reports. The data from 1971 onwards have been compiled from different years Annual Reports of B.P.E. and the Economic Times Surveys.

*a Out (Steel Ingots) refer to production data reported in HSL, Statistics for Iron & Steel Industry in India whereas all other items refer to CMI, ASI and BPE reports.

*b Figures show annual average for the period 1970-79.

Note : Labour includes only workers, employed either directly or indirectly by the Industry.

increase in gross income per worker over the whole period comes to 30% per annum on average. The net income per-worker is estimated to increase on an average rate of 25% per annum. On the other hand approximately 1.26% is the average annual rate of growth of the physical output. Of all the years, the period from 1980-81 to period 1984 has registered the highest rate of growth in the case of both gross and net income of per worker. In the case of value added measure also the rate was highest between 1980-81 to 1985-86. However, there are two years marked by negative growth in income per worker, that is 1960 and 1965. These years are also characterised by the lowest growth in income per-worker. The contradiction between different value measures and physical measures are the result of the difference in rates of growth of income per worker and physical output per worker. The contradiction can also be explained by the differences between the rates of growth of value-added per worker and physical output per worker.

Here, it would be sufficient to point out that the higher rate of increase recorded by the value measured in comparison with the physical counterparts is the result of upward movement to steel prices. The physical output per unit of labour has suffered from the limitation of labour productivity measured in terms of ingot steel because it does not

reflect the tempoeral changes in the mix of finished products. It can be explained with the help of hypothetical case— an industry will have less labour requirements per tonne of output if it produces only rails than if it produces tin plates or alloy bars. Therefore, a comparison between an industry regardless of its product mix will distort the labour productivity. India is carrying out product diversification in the industry. This will result in the increased over-all requirements of man per tonne. It is under estimable, therefore, the labour productivity will be low. It cannot, however, be substantial in the absence of detail information about the product composition in the industry and man-hour requirement for each product.

W A G E S :

The money wages of an average steel workers have been shown in Table-14. There is a steady upward movement of the wages over the whole period. The average wage per worker had declined in the years 1960 and 1962. However, it did not have any effect of the average annual rate of growth of money wage in the Industry which was approximately 29% over a period of 26 years. This rate is the highest during 1980-81, 1984-85 and 1985-86 approximately 40%.

The foregoing analysis produces the following result :-

1. Income Capital ratio both gross and net has sharply declined during the period under review.
2. Unit Capital requirement per-tonne of steel ingot has sharply increased.
3. Value added capital ratio both gross and net has also declined during the same period.
4. Income gross and net both per worker has gone up during the period of analysis.
5. There has been a steady upward movement in case of value added measures.
6. There has been an unsteady upward trend in the physical productivity of labour.

The apparent contradiction in the labour productivity and capital productivity can be explained by the third factor that is the capital intensity. It is clear from the capital labour ratio that labour productivity in Iron and Steel Industry is attained through capital intensification. The capital substitution, has therefore, been the dominant factor responsible for such tendencies for a major part of period of our study. The steady declines in the productivity ratio for capital is the evidence of inefficient use of capital. One reason for this could be long gestation period of large scale investments in Iron and Steel Industry since 1956.

TABLE - 14

TOTAL WAGE BILL, NO. OF WORKERS AND WAGES PER WORKER IN INDIAN STEEL INDUSTRY (At Current Prices)

Years	Total Wage Bill (Rs. in Millions)	No. of Workers (Numbers)	Wage per worker (Rs. per annum)
1960-	262.7	140013	1876.2
1961	345.1	153392	2249.7
1962	389.1	213288	1824.2
1963	447.1	213356	2095.5
1964	516.1	236016	2186.7
1965	585.1	230047	2547.6
1966	658.6	224388	2935.0
1967	737.6	226045	3263.0
1968	794.7	231129	3428.5
1969	852.1	244816	3480.5
1970-79*	2502	236575	10834
1980-81	4252	228333	18187
1981-82	6278	287699	2182.4
1982-83	NA	NA	NA
1983-84	NA	NA	NA
1984-85	9409	368378	25752
1985-86	6646	293803	153374

SOURCE : Data from 1960-70 have been based on HSL reports The data from 1971 onwards have been compiled from different annual reports of BPE and the Economic Times Surveys.

*Figures show annual average for the period 1970-79.

Note :. The measurement of labour includes only workers employed directly or indirectly by the industry.

C O N C L U S I O N

The value-added of the steel group in public sector has been analysed for 26 years (from 1960-61 to 1985-86). Value-added has shown increasing trend. It increased from 9 crores in 1960-61 to 751 crores in 1985-86 or at the rate of 33%. The steel group in public sector, thus, occupies the highest position with 33.2% of growth rate in value added as against 8.55% of growth rate for the entire public sector. Higher growth rate of 'value added' is commensurate with increasing capital stock and capital formation in steel group of public sector. Labour productivity in tonnes of 'value added' registered higher growth in steel industry than in public sector as a whole 5% for the steel group as against 4% for public sector.

The overall efficiency of steel group in Public Sector Enterprises has been faltering for the whole period under review. In the beginning of the period, it has been higher because of establishment of new plants under different successive plan periods, but in the terminal years 1985-86, it was brought down to the tune of Rs. 1,40,480. The reason was steep decelaration in the programme of capital formation. The slow but steady upward trend in capital was recorded owing to increasing value-added at faster rate than the capital stock. The labour efficiency has also in the wake of greater

capital intensity in spite of disparate trends in growth rates of input, total factor productivity and value added.

The second section of the study displays an analysis of productivity trend in the steel industry as a whole including 167 units of steel. It is observed that there has been a sharp increase in the growth of capital per worker employed in the industry. But the capital productivity has declined in terms of income per unit of capital and value added per unit of capital.

The labour productivity both in terms of income per-worker and value added per worker increased. The physical output per worker has also increased. However, it cannot be inferred that higher production is only the contribution of labour because of implicit contribution of other factor such as capital intensity or "technical change".

CHAPTER - VII

CONCLUSIONS AND SUGGESTIONS

Chapter-I deals with the Growth of Public Sector in India. Growth of Public Sector in India is an integral part of Socialistic objectives to be attained through planned economic growth. Public Sector Undertakings have been assigned a significant role in industrial growth and development of India. History of India amply bears it out that the colonial rule crippled the Indian economy, as it was merely a primitive agricultural economy supplying raw materials to the British Industries in exchange for manufactures from England. The bourageos and labour class were exploited by the handful capitalists. It resulted in economic disparity. It was then the intellectuals were seized with the concept of "public ownership" and "Socialism" as a means to emancipating the working class from the dreadful clutches of the capitalists. The concept of Socialism was looked upon as a means to balanced economic development.

Various Industrial policy resolutions were introduced in the years 1945, 1948 and 1956. All policies had almost the similar aim of adopting socialistic pattern of society. Industries were classified according to their importance. It was resolved that alongwith the Government, the State and

private sectors would also actively participate in the task of speedy and steady industrial growth.

In the beginning, Public Sector was assigned to serve the social cause through puclic utility services, viz. Railways, Post and Telegraphs etc. Afterwards, certain industries of strategic significance were earmarked to public sector. However, the public sector has been extended to comprise of commercial activities with the aim of attaining control over the commanding heights of the economy promotion of critical development in terms of social gains or strategic value and generation of surplus for further financing economic development.

Public Enterprises have been contributing considerably towards national income. Production of coal, lignites and petroleum is almost hundred percent in Public Sector. The growth of Public Enterprises has also been phenomenal in terms of number and investment during the years 1951 to 1984. Number of Public Enterprises has risen from 5 in 1951 to 214 in 1984 and the investment from Rs. 29 crores to Rs. 90,262 crores. In all the Public Enterprises, SAIL, CIL, NTPC, ONGC, RECC, FCI, RIN and HPC have claimed lion's share in total investment, viz., Rs. 19,252 crores as on 31st March, 1984. It is obvious that the Government adopted a policy of developing heavy industries".

Public Enterprises have largely been financed by the Government-Foreign participation in capital of Public Enterprises is quite limited. Public Enterprises' have witnessed progressive increase in generation of internal resources. During 1981-82 and 1983-84, the public sector generated internal resources to the tune of Rs. 922.87 crores and 2,830.80 crores respectively after providing for repayments of loans. The resource so generated has been utilized through investment on land, buildings, Roads and installation of plants and machinaries etc. The net investment in loperating enterprises came to Rs. 33,542.70 crores in 1984.

Growth of Public Enterprises can be measured in terms of its shares in domestic products and savings. The Public Sector Undertakings has contributed substantially to the national economy. The gross domestic product has increased from Rs. 316.17 crores in 1970-71 to Rs. 1,45,328 crores in 1983-84 registering the net increase of 25% during the period under review. The domestic product at market price went up from Rs. 5,456 crores in 1970-71 to Rs. 34,588 crores in 1982-83, an increase of 44% per annum. Thus it is discernable that the public sector's gross domestic product has followed an upward trend. The overall growth in savings during 1970-71 and 1983-84 was 46% in contrast with

the growth in Public Sector's savings of 45% on average Public Sector provided 20% of the total gross savings. On the whole it registered 48% growth in net savings.

One of the significant aims of public sector is generation of employment. The study reveals that Public Enterprises has generated more employment than the whole economy. The growth rate for employment in Public Enterprises during the preceding one and a half decades was 3.7% as compared with 2.4% for the whole economy.

Public Sector Undertakings contributed significantly to the national exchequor in the form of dividends and taxes. The total contribution of Public Sector to Central Exchequor was Rs. 1196 crores in 1975-76 of which Rs. 198 crores were in the form of dividend and corporate taxes. 84% of it was by way of excise duty. In 1983-84 contribution of Public Sector Undertakings to national exchequor was Rs. 6,566 crores of it, Public Enterprises paid dividend of Rs. 133 crores and corporate taxes of Rs. 1,339 crore 21% of the total payment by way of excise duty and 79% of Custome duties to the total sizable contribution of Public Sectors to the national exchequor speaks of its tremendous achievements in developmental programmes.

Public Enterprises have now come of age to meet the social, economic and financial objectives by providing substantial scope for increased production, ample return on investment, generation of employment galore, balanced economic growth and development of anciàlliary industries. Public Enterprises assumes significant role in accelerating the process of industrialisation in the country.

The excellence of Iron products in India are associated with ancient history. With the advent of British rule in India, Iron and Steel Industry suffered set back in its development. On the other hand the technological advancement in Europe made the Indian Iron less competitive in international market. Till the end of 19th Century, it was the policy of the British Government to discourage industrialisation. The British Government evinced lack of interest in encouraging modern steel industry in this country. In 1906, TISCO was the first successful Indian Steel Plant. IISCO was the second successful Steel Plant in India established in 1913. The success of the two steel plants is certainly the result of vast natural resources for a steel mill. The expanded domestic production enabled India to sustain higher demand for steel.

India was self-sufficient in steel production till mid 1990's. After 1854, the steel production lagged behind

demand because of significant increase in output. In 1946 a panel set up by the Government presented the report that two mills with the initial capacity of 0.5 M.Ts each should be established under the Control of the Government.

Under the plan period, the steel industry received priority. The second plan was a giant leap forward in steel production in public sector. During this plan, three new steel mills came into existence viz. Rourkela, Bhilai and Durgapur. The first B.F. went on stream in these three plants in 1959. The target for steel capacity was set at 6.8 M.Ts for the third plan with an investment of Rs. 550 crores. The economic recession, however, rendered the capacity idle and forced the country to export 45% of its finished steel in 1976-77. The Fourth Plan considered the capacity of 9 M.T. with finished steel output to reach the capacity level of 8.1 M.T. The Fifth Plan added 17 lakh tonnes to the capacity of Bokaro Steel Plant. The Sixth Plan made provision for the expansion of Salem Steel Plant, Vishakhapatnam and Vijaynagar Steel Plants. The aim of the plan was to attain a consumption level of 8. M.T. in 1979-80. The production of steel including the output of Mini Steel Plant was planned to be raised from 7.4 M.T. in 1979-80 to 11.5 M.T. in 1984-85 and 17.4 M.T. in 1989-90. Seventh Five Year Plan has not made any fresh provision for

addition in capacity either by way of new green-field plants or expansion in the existing capacity. The existing rated capacity of six integrated steel plants by the end of the 7th Plan is expected to increase to 11.6 M.Ts.

Recently SAIL has formulated schemes for technological upgradation of the steel plants at Durgapur, Rourkela and Burnpur (IISCO) at an estimated cost of Rs. 1989 crores. However, performance of steel plants is not satisfactory due to infrastructural constraints including scarce supply of coal, power and bottlenecks in rail transports.

Massive investments in public sector have not yielded higher growth due to the problem of low productivity—it has eagerly remained unattended. The Research Scholar has made an attempt to analyse the problem in succeeding Chapters.

Chapter-II lays down a conceptual frame-work for scientific study of the problem of productivity in public sector. Productivity is a complex concept, full of problems of definitions and measurements. Even today there are different opinions regarding a suitable concept of productivity. The conservative school favours internal rate of return as a measure of productivity, while the others challenge it as a narrow concept and unsuitable to appraise the performance of public sector undertakings. They support the view that

the concept of value of output and services rendered by public investments are an appropriate guide to the working of Public Sector Enterprises. As a matter of fact the concept of productivity denotes increase in output which are not accountable by increase in the quantity of inputs. It is, therefore, based on the assumption of relationship between inputs and outputs.

The phenomenal development of public enterprises is evident from the rising share in domestic product, net capital formation and total employment in the organised sector. It, therefore, assumes paramount significance to undertake a meaningful analysis of the efficiency and productivity of factors of production employed in the Public Enterprises.

Many studies have appraised the performance of public enterprises in terms of financial return (i.e. Profitability). This criterian of profitability measurement has been severely criticised as it does not confirm to the basic objectives of promoting Public Enterprises. The pertinent criteriaton for assessing the performance of these enterprises have to be examined and analysed from objective and academic points of view. The Research Scholar opines that the performancesof Public Enterprises should be measured by drawing a line of demarcation between direct contribution

and indirect contribution. The direct contribution includes the sum of goods and services rendered by an enterprise in the economy, whereas indirect contribution is the impact of production activity of an enterprise through its backward and forward linkages on general level of economic activity in the country. The capital investments mainly provide basic infrastructures whose benefits are received by economy as a whole in the form of higher level of economic activity. Hence financial return (profitability) is not a suitable criterian of productivity appriasal of Public Enterprises.

The broad framework which the present study had adopted for analysing the productivity trends in Public Enterprises has been expressed in the form of following equation :-

$$P = f(G_K, G_L, G_A)$$

where P, G_K, G_L and G_A denote that the productivity is the function of capital input, labour input and overall efficiency of factor inputs respectively over a given period of time. Research Scholar is of the opinion that the total factor productivity is appropriate for evaluating the overall performance of Public Enterprises. Therefore, the index of total factor productivity has been prepared as a measure of output per-unit of total input. The index of total factor productivity is a useful device to measure the extent of change

(increase/decrease) in overall efficiency of factor input in any production process.

Steel industry is taken up by me as a case study of productivity for a period spanning over 26 years i.e. from 1960-61 to 1985-86. The analysis of productivity trend in the steel industry has been divided into sections first section deals with the Public Sector steel plants and the second is concerned with the steel Industry as a whole comprising both the public and private sector steel mills. The later part of steel productivity analysis has been made more meaningful and objective for academic purposes by sub-classifying the productivity measures in terms of income, value-added, and physical output ratios to capital and labour separately.

The Research Scholar has applied conventional accounting method to measure the operational efficiency in Chapter-III and IV.

Chapter-III examines the efficiency of Public Sector Undertakings into two broad parameters viz. financial and physical. In financial analysis the Research Scholar has examined profitability, growth of sales, capital employed and investment in technology for replacement and modernisation, the

physical performance includes appraisal of capacity utilisation and trends in the utilisation of capacity in various significant Public Sector Undertakings.

Profitability profile of Public Enterprises during 1974-75 and 1985-86 reveals increase both in the number of units and the capital employed. The number of enterprises during the period under review increased from 120 units to 201. The capital employed also increased from 6,654 crores to Rs. 29,896 crores. However, large investment of capital in ever-increasing number of units failed to yield a fair return. The profitability of Public Enterprises is the cumulative result, among other things, of higher cost of production. The gross sales vary within a very wide band. It is an indication of the lack of imaginative production and sales policies. The study also reveals that loosing concerns largely consist of manufacturing enterprises - 74 the manufacturing enterprises out of 92 were the loosing concerns in 1984-85. The total losses of all the units, except petroleum industry amounted to Rs. 15,584.03 crores till 1984-85. It led to the erosion of 39% of the equity capital.

Poor financial performance is verified by the physical appraisal of Public Enterprises which is undertaken by the Research Scholar because capacity utilisation and profitability are inter-connected. The analysis reveals that none

of the Public Enterprises was able to attain normal capacity. Even after decades of their existence, a number of the units have not been able to utilise as much of the capacity as 25%. The highest capacity utilisation is 75% attained by less than 70% of the enterprises. The Research Scholar is of the view that appropriate policies have to be formulated to deal with the problems of low capacity utilisation.

The Research Scholar is aware of his limitations to offer general treatment to the problems. There cannot be one set of reasons of low capacity utilisation in the whole Public Sector Undertakings. Therefore, a group-wise analysis is made of the important sectors in Public Enterprises in a bid to diagnose the disease and suggest the treatment. Analysis of the steel group suggests infrastructural problems undermining the physical performance of steel plants. Plants showing very low capacity utilisation in the steel groups have suffered from inadequate power supply, poor quality of coking coal and paucity of fuel. In the case of coal sector there was a loss of 11 MTS. of production due to technical problems in dealing with the inundated mines, fluctuating power supply and poor industrial relations. Improper maintenance is the cause of low utilisation of capacity in the mineral and metal sector. The fertiliser industry, chemicals and pharmaceutical, heavy engineering, light and medium engineering, transport

Industry also operated below normal capacity because of low inventories of spare parts among other things.

Most of the working capital of Public Enterprises consists of stocks (inventories) of raw material work in process and finished goods. Spare parts for proper maintenance of plants are generally out of stock which crippled the performance of units during unforeseen breakdowns. The Research Scholar has suggested substantial reduction in inventories equal to normal trade cycle of two months production if the efforts to minimise cost of production are to succeed.

It is impossible for a concern to be viable without investment in technology. Investment by Public Enterprises in modernisation and replacement is not adequate. The resources generated by Public Enterprises internally do not allow them to undertake any large programme of modernisation. The Research Scholar has suggested that technological improvement should be given precedence over other allocation.

It has to be a multi-proged approach to deal with the malaise of low capacity utilisation. The Research Scholar has made the following suggestions :-

1. An expert team consisting of academicians as well as technicians should be constitued for indepts study of individual enterprises to identify the cause

of low capacity utilisation.

2. Infrastructural facilities should be adequately provided which frequently undermines the performance of Public Enterprises.

3. Management of Public Enterprises should be assigned to important professionalism.

4. Dependence of Public Enterprises on spare parts from abroad should be reduced by establishing ancillary units.

5. The resources of Public Enterprises should be effectively deployed including reduction in inventories to normal trading cycle, to minimise the cost of production.

6. Export activities of Public Enterprises should be promoted for more exchange earnings.

Proceeding with his endeavour, Research Scholar has ventured to undertake appraisal of steel industry in Chapter-IV to identify cause of its unsatisfactory performance.

There are six integrated steel plants in Public Sector operating under the aegis of Steel Authority of India Limited (SAIL) viz. Durgapur Steel Plant, Bhilai Steel Plant, Rourkela Steel Plant, IISCO, VISL (a new steel plant) and TISCO in the

Private Sector, held over 90% of the installed capacity in the country.

In this Chapter, Research Scholar has made an attempt to assess the performance of six integrated steel plants (including TISCO) in two broad scales, viz. Financial and Social (i.e. physical) returns. Under financial return, the profitability profile of SAIL has been presented for the period 1978-79 and 1983-84. It is observed that SAIL earned profit. The declining rate had persisted during the entire period under study. In 1983-84 a profit of Rs. 86 crores was realised on the capital of Rs. 3,000 crores. yielding 2.9% of return. The SAIL also adopted the policy of free reserves in the form of depreciation and DRE which had accumulated from year to year. In 1983-84, SAIL accumulated a chunk of Rs. 163 crores which is completely inconducive to and against the consumer interest because depreciation is the cost of capital transferredto consumers. The SAIL has also used the free reservers for more loans which have grown by 161.3% since 1978-79 as compared with the growth of 55% in equity.

The study of the SAIL's PBIT shows that every year, from 1978-79 to 1982-83, a substantial amount was added to the free reserves. As a result the profit declined. In 1979-80, Rs. 112 crores were added to free reserves in 1980-81,

Rs. 114 crores were transferred to free reserves out of the total gross margin of Rs. 208 crores. In 1983-84, SAIL, deliberately allowed the gross margin to become net loss due to a transfer of massive amount of Rs. 160 crores, to free reserves. The Research Scholar observes that this policy of enhancing free reserves will have to be dispensed with if the erosion in equity has to be averted.

Analysis of interest and loan shows highly deflated figures. For instance, the interest of Rs. 32 crores on loans of Rs. 2,260 crores constitute unimaginably low rate of interest viz. 1.4%. Instead, the SAIL appears to have paid 8 % interest, as evident from free reserves utilised for the purpose.

The plant-wise analysis of SAIL's working result displays that Durgapur Steel Plant has suffered heavy losses of Rs. 138.78 crores during the period 1979-80 to 1983-84. It incurred, heaviest loss in the year 1983-84, viz. 63.72 crores and the tiniest loss of Rs. 8.44 crores in 1980-81. Rourkela Steel Plant takes the second place with the loss of Rs. 113.69 crores. Then, comes the Alloy Steel Plants with a cumulative loss of Rs. 57.11 crores during the five year period under study. Bokaro Steel Plant also suffered loss of Rs. 52 crores in the initial two years, viz. 1979-80

and 1980-81 and earned profit of Rs. 19 crores in the subsequent two years. Salem, the new Steel Plant accumulates loss of Rs. 32 crores in two years i.e. 1982 and 1984.

In this context, it may be observed that equity is likely to be wiped out if losses are not averted. Measures to tackle the problems must include restructuring of capital and amortization of loans at least to reduce debt-burden.

Steel pricing policy of the Government has also failed SAIL to generate adequate surplus. In fact, price of steel lagged behind the increasing cost. Cost of a tonne of steel increased to 205 points as compared with administered price which was raised to only 171 points, leaving a gap of 14% between selling price and the unit cost. As a consequence, SAIL suffered loss of Rs. 45.6 crores. In 1977, the Government changed the policy to revise price upward in tune with the rising cost, following hike in coal price, freight and power charges. SAIL also reduced the level of inventories and made efforts to normalise its industrial relations. This policy continued only till 1982. With the existence of Salem Steel Plant, again the cost of production lagged behind selling price in 1984. The price was not raised in tune with the rise in cost. As a result thereof, SAIL incurred heavy loss in 1984. The Research Scholar

observes that administered prices are a severe constraints on surplus generation capacity of SAIL.

Profitability ratios for the years i.e. 1982-83 and 1983-84 present a dismal picture of SAIL performance ratio of gross profit to net sales was negative. It is indicative of higher sale and manufacturing costs than the price administered by the Government. Negative return on capital employed resulted in the loss net worth of SAIL. It may be inferred that SAIL is unlikely to generate sufficient resources from its operation to maintain its net worth intact. Two options are available to the management of Steel Plants either they can scrap the idle capacity of the plant or maximise productivity in a bid to reduce the cost to the land of the price administered by the Government. However, the first programme involving scoping of this idle capacity would be undesirable both from social and economical points of view. Therefore, every attempt should be made to reduce unit cost through higher productivity.

The Research Scholar has estimated the physical performance to examine as to whether the social capital is used by the industry efficiently. Appraisal of production performance of steel industry vindicates the vew that performance would have been far better, had there been efficient utilisation of capacity. It is observed from the

statistical analysis that the steel plants under SAIL have failed to reach optimum output level of 90% of the rated capacity. TISCO (in private) is the only Steel Plant which had utilised about 9[illegible]% of the rated capacity during the period 1975-76 to 1984-85 while the SAIL had utilised only 76% of its rated capacity during the same period."

The wavering performance of SAIL may be partly accounted by the difference in the size of blast furnace and ore-charges. Most of the steel plants in public sector are lacking modern sintering, bedding and blending facilities. This ultimately affects the productivity of blast furnaces.

The production performance has also suffered from poor quality of coal and frequent fluctuations in power supply The Steel Industry has to use coal with 28% of dust content as against the safe limit of 16%.

Equally responsible for poor performance of SAIL has been the inefficient man power recruitment policy and planning. Excessive labour force depressed labour productivity. The strained industrial relations, top heavy organisation, technological difficulties, initial production, bottlenecks and investment planning for large capacities act as a severe constraints on the proper functioning of Public Sector Steel Plants. Also unduly large inventories, lack of co-ordinated market research and development

programmes and low production targets match add to idle capacity and low productivity in the Steel Plants of the Public Sector.

The Chapter-V examines productivity trend in Public Sector Enterprises in an attempt to reveal as to whether Public Sector has optimum use of its resources. Public Sector registered growth in its contribution to net domestic product at the rate of 8.53% during the period under study. The study reveals that commodity producing enterprises are major segments of Public Sector, contributing 55% of the real net domestic product of the Public Sector as a whole. Substantial growth in Public Sector's share in net domestic product has followed rapid capital formation and more employment of labour force. For instance, the net capital stock increased from Rs. 6,233 crores in 1960-61 to Rs. 40,262 crores in 1985-86 during the period of study. It is discernible from the study that there has been deceleration in capital formation when the same is analysed for sub-periods 11% during 1960-61 to 1967-68 which declined to 8.6% during 1975-76 to 1985-86. The commodity producing enterprises had 69% of the total capital stock in 1985-86.

Of the two sectors, non departmental enterprises employed more workers than the departmental 57 lakhs in 1985-86 in

non-departmental enterprises as against 35 lakhs in departmental enterprises. It is worth citing that additional employment is provided by commodity producing enterprises 63% by commodity producing enterprises and 37% by the tertiary sector. In broad terms, 62% of the labour force of the Public Sector is employed in non-departmental enterprises.

It may be observed that the non-departmental enterprises are the leading Public Enterprises, holding most of the capital employing most of the workers. Share of labour and capital both in domestic product increased at current prices as well as in real terms. The labour income increased from 60% of the net domestic product in 1960-61 to 77% in 1985-86. The real labour earnings increased from Rs. 1,408 per annum in 1960-61 to Rs. 9,555 in 1985-86.

Measured as a ratio of output to labour, the labour productivity revealed rising trend. However, the trend in labour productivity varied from tertiary sector to commodity producing sector, and from departmental enterprises to non-departmental enterprises during the period of study. The labour productivity increased from Rs. 2,234 in 1960-61 to Rs. 12,027 in 1985-86.

It is worth noting that the capital labour ratio registered rapid growth during the period of study from Rs.20,559 in 1960-61 to Rs. 46,891 in 1985-86, because high degree of technology is used in public enterprises.

The capital productivity, as a ratio of output to capital is marked by two distinct trends initially rising till 1975-76 and later on it declined. It shows inadequate regard to the creation of additional capacity which remained idle due to infrastructural bottlenecks, labour troubles etc.

The total factor productivity is affected because of divergent trends in capital and labour productivities. The total factor productivity as a ratio of net product to total factor input registered rising trend in the case of non-departmental enterprises and declining trend in the case of departmental. However, performance of commodity producing sector is better than that of the tertiary sector.

Comparing the trend in total factor inputs with that of the net product, it is found that the total factor input takes on "U" shape and the total factor productivity takes on inverted "∩" form. Initial increase in the total factor productivity is the result of more than proportionate increase

in net product than in factor input, and vice-versa when the total factor productivity declined.

It may be inferred that the public sector has not been efficiently utilising its resources.

Chapter-VI examines the productivity trend in Iron and Steel Industry. Public Sector Industry comprises the steel plants of SAIL, IISCO and Sponge Iron Steel. The productivity of Iron and Steel has been measured in terms of capital productivity labour productivity and the total factor productivity both.

Value-added has been estimated for 26 years (from 1960-61 to 1985-86). In order to find out the trend, the entire period of study has been divided into five sub-periods (from 1960-61 to 1964-65, 1964-65to 1969-70, 1969-70 to 1974-75, 1974-75 to 1979-80, 1979-80 to 1985-86 and 1960-61 to 1985-86). It is worth citing that the value-added increased from Rs. 9 crores in 1960-61 to Rs. 751 crores in 1985-86 yielding an annual growth of 33%. In 'valueaadded' Steel Industries rank first among Public Entepprises which registered 89% of growth.

The growth of 'value-added' is the function of capital stock and the aatpital formation. In 1960-61 the capital

stock was Rs. 1,060 crore; with capital formation of Rs.10 crores which substantially increased to Rs. 3,512 crores and Rs. 176 crores in 1985-86 respectively. The trend in the growth of capital stock and capital formation reveals significant rise in every subsequent sub-period. The average growth rate for the whole period of study i.e. from 1960-61 to 1985-86 was 6.27% per annum. It has been observed by the Research Scholar that steel group, though heavily capital intensive industry, has, indeed, expanded at a lower rate than all the public enterprises.

The labour is an important input in the steel production process. Study has been made by the Research Scholar regarding the number of workers, value-added and value-added per-workers for the period under study. In 1960-61, the number of workers was 91,008 which increased to 2,48,443 in 1985-86. Labour productivity in terms of value-added per worker reveals an increasing trend, that is, in 1960-61 the value added per worker was Rs. 1000 which increased to Rs. 30,040 in 1985-86. The increase in value-added per worker has been made possible because of greater increase in value-added than in employment. The estimates of annual growth rates of employment in steel group for the whole period i.e. 1960-61 to 1985-86 was 5.02% per annum, while that for Public Enterprises as a whole it was 4.6% per annum.

The overall efficiency of steel group in public sector has been estimated. It is accepted that the overall efficiency of inputs depends on technological improvement and the capital intensity is a comprehensive indicator of the extent of technology used in production process of an enterprise. The analysis of capital intensity reveals that in 1960-61, when steel plants were newly established with minimum work force, the capital per worker was highest (Rs, 1,17,778). Analysis reveals steady increase in capital intensity from Rs. 1,17,773 in 1960-61 to Rs. 1,78,733, though it declined to Rs. 1,40,480 in 1985-86. The latter nine year period (1978-86) is marked by decelerated capital formation.

The trends in capital productivity have been lack lustre but steady in its upward movement. If capital productivity is measured in terms of value-added, it increased from 0.8% in 1960-61 to 21% in 1985-86. It may be deduced that the value-added increased at a faster rate than the capital stock.

Total factor productivity has also been estimated with the help of indices for value-added, labour input and capital input. The total factor productivity increased 28 times over the past during 1960-61 and 1985-86. However, the Research Scholar discerns disparate trends in the growth rates of

inputs total factor productivity and value-added.

The Steel Industry, as a whole has been examined for a further probe into productivity trend. It is observed by the Research Scholar that there has been a sharp increase in the growth of capital per worker employed in the industry. The capital productivity has declined in terms of income and value-added per unit of capital. On the other hand, capital requirements per-tonne of ingot steel have shot up sharply due to high capital cost, and long gestation period.

The labour productivity both in terms of income per worker and value-added per worker increased in public sector steel industry. However, TISCO registered a higher productivity due to judicious combination of factor inputs and product-mix a policy which cannot be practised in public steel plants if they are to fulfil social obligations, viz. creation of more jobs and to act as model employers.

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ANNEXURE - I

PROJECTED DEMAND AND AVAILABILITY OF FINISHED STEEL PRODUCTS IN INDIA

('000' tonnes)

Products	1984-85 Demand	1984-85 Availability	1984-85 Deficit(-) Surplus(+)	1989-90 Demand	1989-90 Availability	1989-90 Surplus + Deficit -
1. Bars & Rods	5,500	4,313	(-) 1,237	8,042	6,579	(-) 1,463
2. Structurals	1,725	1,247	(-) 482	2,600	3,024	(+) 424
3. Plates	1,690	1,747	(+) 57	2,506	2,092	(-) 414
4. HR Coils, Sheets Skelp	1,696	1,486	(-) 210	2,547	2,220	(-) 327
5. CR Coils/Sheets	833	1,420	(+) 587	1,100	1,330	(+) 230
6. GL/GC Sheets	320	340	(+) 20	421	440	(+) 19
7. Tin Plates	203	220	(+) 17	243	275	(+) 32
8. Electrical Sheets	281	114	(-) 67	315	263	(-) 52
9. Railway Materials	498	508	(+) 10	626	523	(-) 103
	12,700	11,395	(-) 1,996 (+) 691	18,400	16,796	(-) 2,359 (+) 755

*Availability figures worked out for 1989-90 takes cognisence of 1.35 mt. capacity output of crude steel from a new plant (Pradeep)(Deutari) corresponding finished steel is 1.15 mt. If the Plant does not materialise by 1990, the gap would widen.

SOURCE : Report of the working group on iron and steel setup by Planning Commission.

APPENDIX - 3

PERCENTAGE OF ASH AND VOLATILE MATTER IN COAL & COKE SUPPLIES TO STEEL PLANTS

Sl. No.		As per Norms	1975-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84 April-Dec.
1.	Bhilai :										
	Ash in Coal Blend	16.4	18.86	18.99	19.84	20.20	19.60	20.10	19.70	18.70	20.50
	Coke Ash	22.0	26.07	25.60	26.30	26.80	25.90	23.61	26.10	24.70	NA
	N.M. in Coal	-	23.98	24.00	24.90	24.70	24.40	23.60	23.70	23.10	NA
2.	Durgapur :										
	Ash in Coal Blend	16.5	21.03	20.22	20.44	21.12	22.69	21.96	28.13	18.52	21.10
	Coke Ash	22.5	27.30	26.20	26.40	22.30	20.93	28.13	28.41	28.20	NA
	N.M. in Coal	-	21.90	23.63	23.53	23.46	22.57	23.31	21.92	21.92	NA
3.	Rourkela :										
	Ash in Coal Blend	17.00	19.11	18.91	19.05	18.95	19.61	19.41	18.87	18.70	20.50
	Coke Ash	23.0	27.16	27.39	22.03	26.79	25.90	24.43	25.28	24.20	NA
	V.M. in Coal	26.0	24.66	24.05	25.10	25.18	24.86	24.12	23.94	23.10	NA
4.	Bokaro :										
	Ash in Coal Blend	17.0	20.61	19.83	20.35	20.46	21.18	21.78	22.05	21.78	22.60
	Coke Ash	22.5	26.71	25.54	26.14	26.49	22.36	28.15	27.14	NA	NA
	V.M. in Coal	27.9	24.23	24.31	23.85	23.85	23.72	23.8	23.22	NA	NA
5.	IISCO :										
	Ash in Coal Blend	-	20.76	19.93	20.20	20.83	21.41	21.71	22.20	21.85	22.20
	Coke Ash	-	28.06	27.32	26.22	27.54	28.52	28.65	-	28.18	NA
	V.M. in Coal	-	25.12	25.58	25.03	25.05	24.92	24.92	24.80	24.80	NA
6.	TISCO :										
	Ash in Coal Blend	-	18.70	18.05	19.05	19.66	21.31	21.24	20.39	NA	NA
	Coke Ash	-	-	-	-	27.05	26.07	-	-	NA	NA
	V.M. in Coal	-	24.70	26.57	25.94	25.72	25.04	24.64	26.87	NA	NA

SOURCE : The Economic Times, 25th Jan,1984, Note :- Data for April-Dec.1983-84 are provisional.

APPENDIX - 4

FORWARD LINKAGES OF STEEL SECTOR-WISE FOR 1979-80

Sl. No.	Govt. Departments/Units	Consumption ('000 tonnes).
1.	Defence	91
2.	State Electricity Board	597
3.	Public Works and Irrigation	811
4.	Other Govt. Departments	136
5.	Railways (including wagon building)	648
6.	Coal Industry	87
7.	Oil (Petroleum)	148
8.	Heavy Industry (Public Sector)	364
9.	ELPC	235
10.	Steel Plants (Self consumption)	260
11.	Large Scale Industry	1,853
12.	SSI Corporations	496
13.	Small Scale Industry	898
14.	Houses & Buildings	1,466
15.	Others	567
	T O T A L S:	8,309

SOURCE : SAIL estimates quoted in technical note on the Sixth Plan of India, 1980.85, P.212.

ANNEXURE - 1

PROJECTED DEMAND AND AVAILABILITY OF FINISHED STEEL PRODUCTS IN INDIA

('000' tonnes)

Products	1994-95 Demand	1994-95 Availability	1994-95 Deficit(-) Surplus(+)	1989-90 Demand	1989-90 Availability	1989-90 Surplus + Deficit -
1. Bars & Rods	5,500	4,313	(-) 1,237	[illegible]942	6,579	(-) 1,[illegible]63
2. Structurals	1,72[illegible]	1,247	(-) [illegible]32	2,600	3,024	(+) [illegible]21
3. Plates	1,690	1,747	(+) 57	2,506	2,092	(-) 414
4. HR Coils, Sheets Strip	1,[illegible]96	1,[illegible]86	(-) 210	2,547	2,220	(-) [illegible]27
5. CR Coils/Sheets	[illegible]33	1,[illegible]20	(+) 587	1,100	1,3[illegible]0	(+) [illegible]81
6. GL/GC Sheets	320	340	(+) 2[illegible]	421	440	(+) [illegible]9
7. Tin Plates	203	22[illegible]	(+) 17	243	275	(+) 32
8. Electrical Sheets	281	11[illegible]	(-) 67	315	263	(-) 5[illegible]
9. Railway Materials	498	508	(+) 10	626	523	(-) [illegible]03
	12,700	11,395	(-) 1,996 (+) 691	18,400	16,796	(-) 2,[illegible]59 (+) [illegible]55

*Availability figures worked out for 1989-90 takes cognisence of 1.35 mt. capacity output of crude steel from a new plant (Pradeep)(Dautari) corresponding finished steel is 1.15 mt. If the Plant does not materialise by 1990, the gap would widen.

SOURCE : Report of the working group on iron and steel setup by Planning Commission.

APPENDIX - 2

CONSUMPTION OF ENERGY BY STEEL PLANTS

Year	Coking Coal dry ('000 tons)	Non Coking Coal for Captive Power & Process Steam('000 tons)	Purchased Power M 4	Petroleum based fuels ('000 tons)	Total energy input 10 gega calories
1979-80	10,730	1,809	1,776	244	82.6
1980-81	10,387	2,016	1,670	200	81.2
1982-83	11,389	2,121	2,146	288	88.7
1983-84	11,245	2,42[illegible]	2,382	299	[illegible]8.1

SOURCE : Economic Trends, 16 May, 1984, Vol. XIII No.10